

AEROFLEX

7N-33-CR
134124

ACCEPTANCE DATA PACKAGE


NASA CONTRACT NAS8-39409

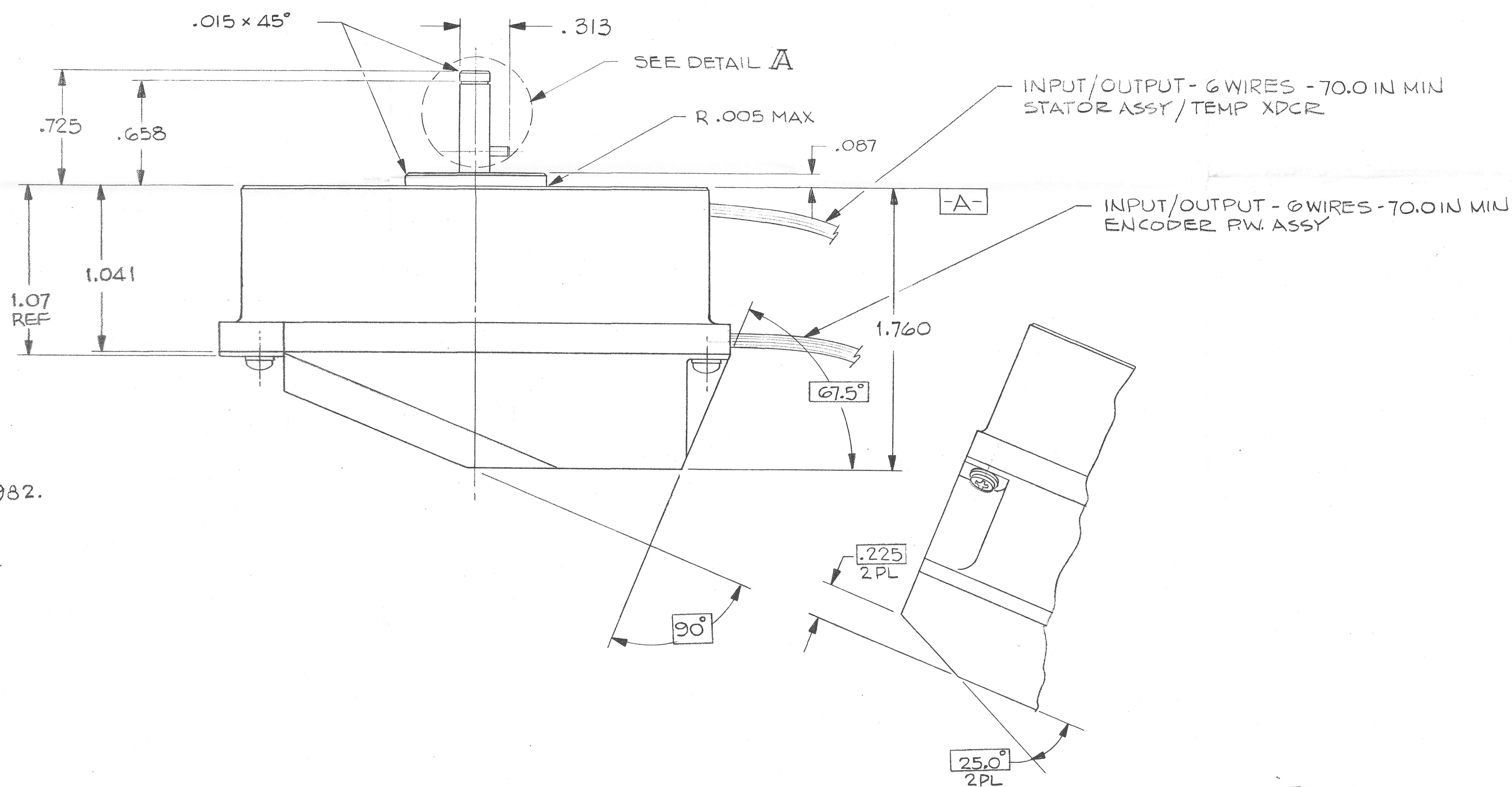
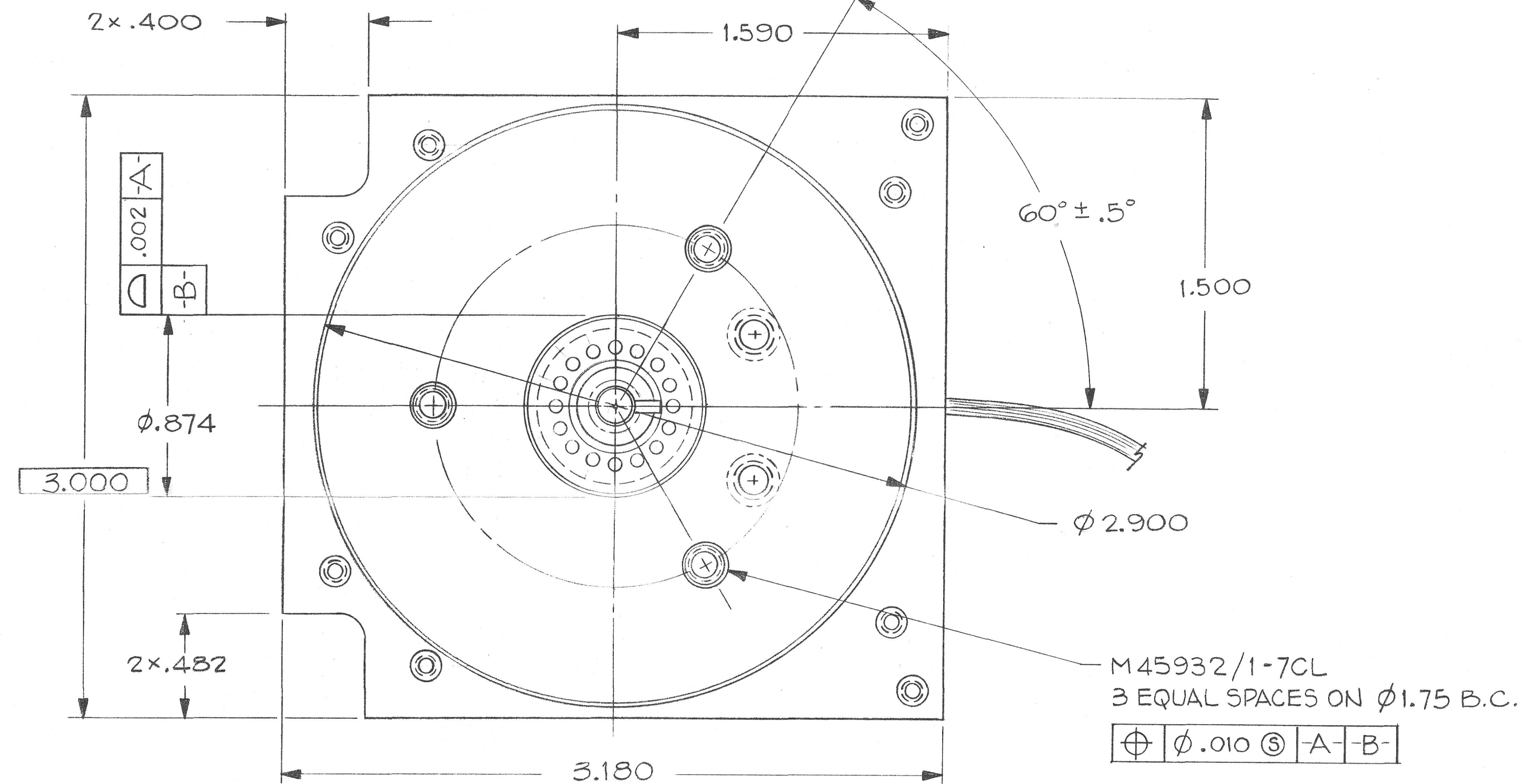
SXI STEPPER MOTOR/ENCODER

AEROFLEX P/N 16187

**A - ENGINEERING DRAWINGS AND
ASSOCIATED LISTS**

Microelectronics
Instrument Products
Shock and Vibration
Electro-optics

R NO NASB-39409		 <div> LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803 </div>			
APPROVED <i>W. J. Vanelli</i>	DATE <i>10-15-93</i>	MOTOR / ENCODER SOLAR X-RAY IMAGER (SXI)			
<i>N. J. Vanelli</i>	<i>5/13/94</i>				
<i>S. J. King</i>	<i>5-15-94</i>				
<i>A. J. King</i>	<i>5-18-94</i>				
<i>Code for</i>	<i>5-13-94</i>				
SCALE: 2/1		SIZE D	CAGE CODE 88379	DWG NO 16187	REV B
SHEET 1 OF 1					



NOTES:

1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. FOR ASSEMBLY DRAWING SEE 200-89.
3. FOR CONNECTION DIAGRAM SEE 532-2.

ENVELOPE DRAWING

<div>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ±.030 3 PLACE DECIMAL ±.010 ANGULAR ±0° 30'</div> <div>BREAK SHARP CORNERS .005 MAX R</div>		CONTR NO <u>NAS8-39409</u>		<div><div>AEROFLEX</div><div>AN ARX COMPANY</div><div><div>LABORATORIES INCORPORATED</div><div>PLAINVIEW N.Y. 11803</div></div><div><div>MOTOR / ENCODER</div><div>SOLAR X-RAY IMAGER (SXI)</div></div></div>			
		BY OR APPROVED	DATE				
		DWN <u>fil Janilli</u>	<u>10/15/93</u>				
		CHK					
<div>ALL <input checked="" type="checkbox"/> SURFACES TO BE <input checked="" type="checkbox"/></div> <div>MATERIAL</div>		DESIGN <u>pmu</u>	<u>5/13/94</u>	<div><div>SIZE</div><div>CAGE CODE</div><div>DWG NO</div><div>REV</div></div> <div><div>88379</div><div>16187</div><div>B</div></div>			
		ENGRG					
<div>NEXT ASSY</div> <div>USED ON</div>		ENGRG <u>thompson</u>	<u>5-15-94</u>			<div><div>SCALE: 2/1</div><div>SHEET 1 OF 1</div></div>	
		PROJ <u>PL-001</u>	<u>5-13-94</u>				
<div>APPLICATION</div> <div>DO NOT SCALE DRAWING</div>		QA <u>C. J. Adreese</u>	<u>5-13-94</u>				
		MFG <u>with the 12</u>	<u>5-14-94</u>				

PROPRIETARY
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE	5/13/94	ABF
	C	REVISED PER ECN 11861	9-14-95	AA

PROCEDURES

1. 5-068-0 BONDING PROC-2650
2. 5-071-0 BONDING PROC-280
3. 5-125-0 BONDING PROC-2651
4. 5-128-0 CLEANING PROC
5. 5-129-0 CLEANING PROC
6. 5-130-0 CLEANING PROC
7. 5-134-0 CLEANING PROC
8. 5-222-0 FLUIDIZE BED COAT PROC
9. 5-258-0 MAGNET INSPECT PROC
10. 5-283-0 BONDING PROC-1564
11. 5-284-0 CLEANING PROC
12. 5-294-0 BOND/STAKING PROC
13. 5-296-0 VACUUM BAKE PROC
14. 5-297-0 ENCODER ALIGN PROC
15. 5-298-0 VACUUM BAKE PROC
16. 5-305-0 CLEANINESS CONTROL
17. 5-316-0 CLEANING PROC
18. 960-229 BONDING PROC-M620
19. 960-251 BONDING PROC-E645
20. 110P371 CONTAMINATION CONTROL
21. ATP20049 ACCEPTANCE TEST

MOTOR/ENCODER

16187

MOTOR/ENCODER ASSY

200-89

ENCODER

110E381

ENCODER ASSY 21770

RETICLE ASSY 21763

RETICLE 21787

RETICLE PLATE 21666

EPOXY ADHESIVE 612-87

ENCODER DISK ASSY 21766

ENCODER DISK 21788

HUB, ENCODER 21680

EPOXY ADHESIVE 612-87

PW BD ASSY-LED 21774

PW BD LED 21775

SCHEMATIC LED 21667

LED

SHIELD 21761

SHIELD 21762

ENCODER MOUNTING PLATE 21670

BRACKET, READOUT 21672

HARDWARE-MISC

PW BD ASSY-ENCODER 21664

PW BD ENCODER 21665

SCHEMATIC, ENCODER 21667

COMPONENTS

SHIELD 21759

SHIELD 21760

SHIELD 21796

SHIELD 21819

ENCODER OUTLINE 21781

STATOR ASSY

500-29-9

STATOR CORE 502-29-9

LAMINATION 512-11-14

EPOXY ADHESIVE 612-3

FLUIDIZE BED COAT 612-54

TAPE 507-39-25

CORD,LACING 508-22-7

INSERTION INSTRUCTIONS 520-248

COIL WINDING DATA 521-425

FINISH DATA 522-472

WIRE, MAGNET M1177/14-01C036

WIRE,MAGNET M1177/14-01C037

WIRE, ELECTRICAL M22759/18-26-9

ELECTRICAL RESIN 612-47-1

BEARING, DUPLEX 403-1-7

COVER 301-61

HOUSING ASSY 301-60

INSERT

INSERT

LINER,BEARING 404-13-61

NUT, RING-OUTER 607-448

NUT, RING-INNER 607-449

WIRE, ELECTRICAL M22759/18-26-*

ELECTRICAL RESIN 612-47-1

PIN, LOCKING 607-450

HARDWARE-MISC

TEMP TRANSDUCER 5962-8757103XX

WIRING DIAG. 532-2

EPOXY,THERMAL 285/CAT 9

EPOXY ADHESIVE 2850/CAT 9

EPOXY,STAKING PR1564 A&B

PW ASSY-TEMP XDCR FLTR CKT 303-216

PW BD-TEMP XDCR FLTR CKT 303-217

SCHEMATIC TEMP XDCR FLTR CKT 531-56

ASSY FLOW 960-295

ROTOR ASSY

400-29-6

ROTOR HUB & SHAFT 402-29-9

EPOXY ADHESIVE 612-3

MAGNET 411-291-2

EPOXY ADHESIVE 612-20

MAGNET 411-291-3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
2 PLACE DECIMAL ±.015
3 PLACE DECIMAL ±.005
ANGULAR ±0°30'

BREAK SHARP CORNERS .005 MAX R

ALL SURFACES TO BE

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTR NO

BY OF APPROVED

DATE

DWN

Camino Martino 5/13/94

CHK

DESIGN J. Martino 5/13/94

ENGRG

ENGRG

PROJ

ABF 5/13/94

QA

C.V. Ledwith 5/13/94

MFG

K. Althaus 5/13/94

AEROFLEX

LABORATORIES

PLAINVIEW
INCORPORATED N.Y. 11803

DRAWING TREE
MOTOR ENCODER

SIZE

CAGE CODE

DWG NO

REV

D

88379

200-88

C

SCALE

NONE

SHEET

	16187
NEXT ASSY	USED ON
APPLICATION	

8

7

6

5

4

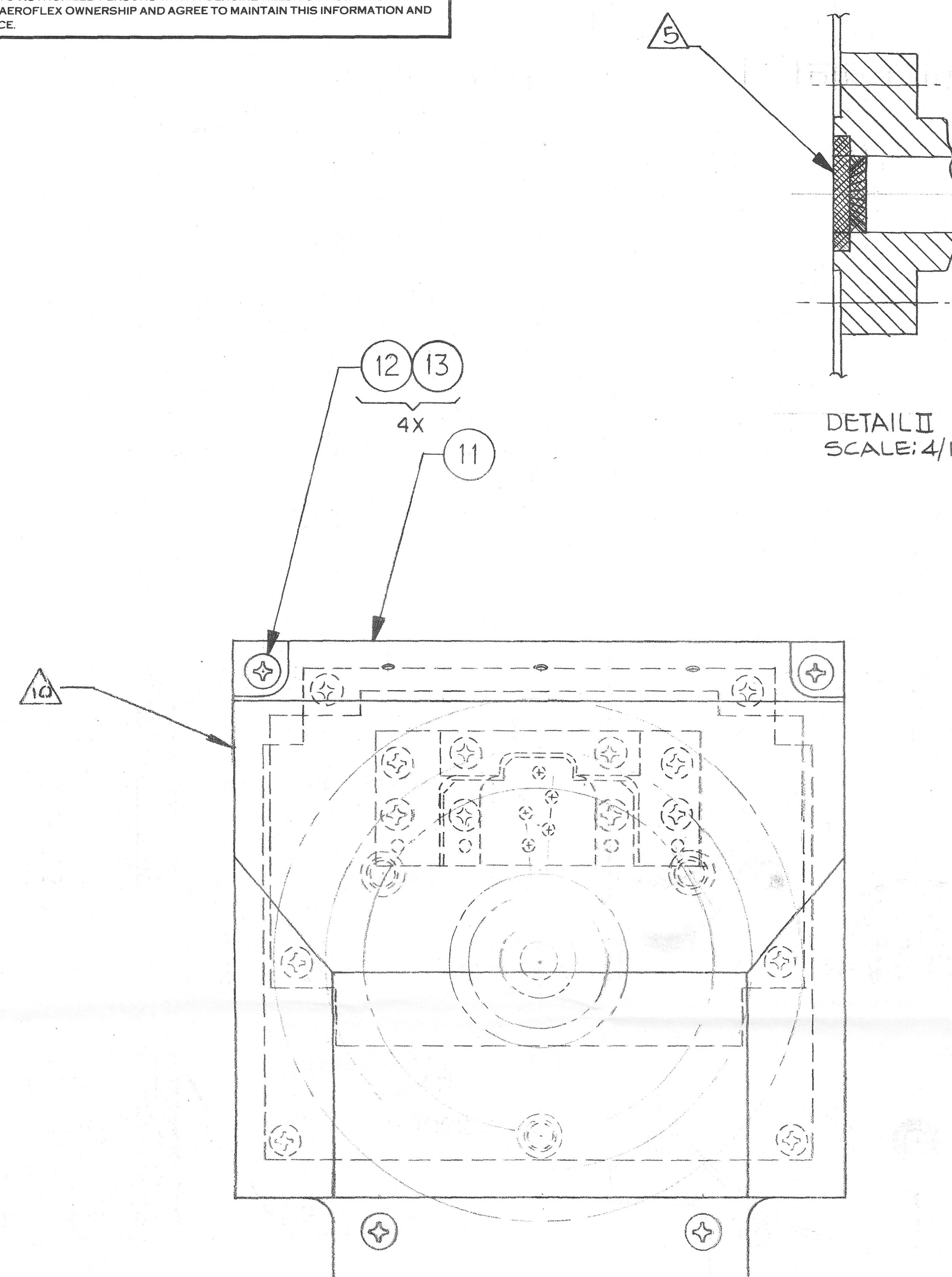
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2

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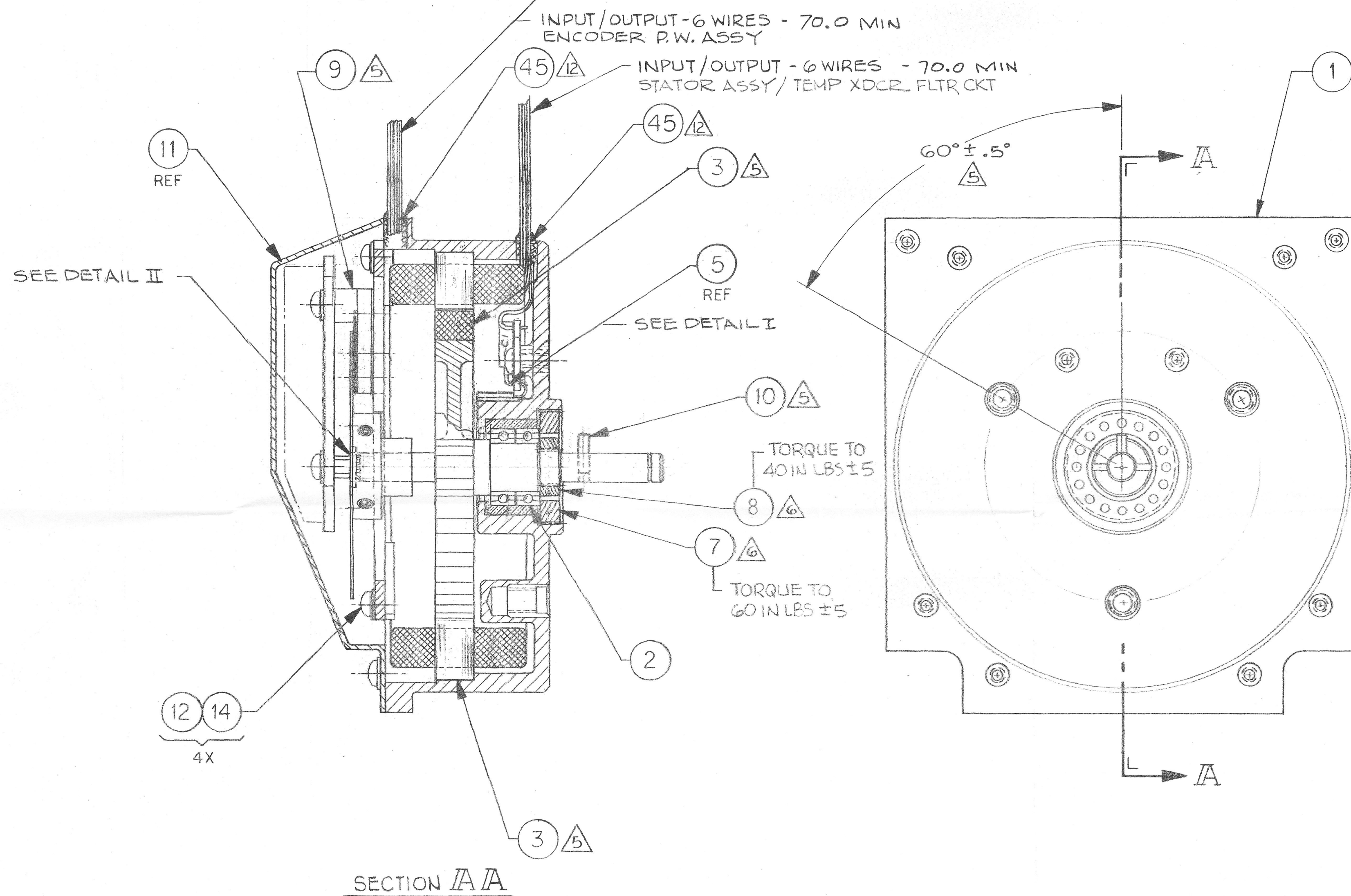
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE	5-13-94	At
	C	REVISED PER ECN 11861	6-16-94	At
	D	REVISED PER ECN 11861	10-5-94	At
	E	REVISED PER ECN 11869	11-30-94	At



DETAIL II
SCALE: 4/1

DETAIL I
SCALE: 4/1



NOTES: UNLESS OTHERWISE SPECIFIED

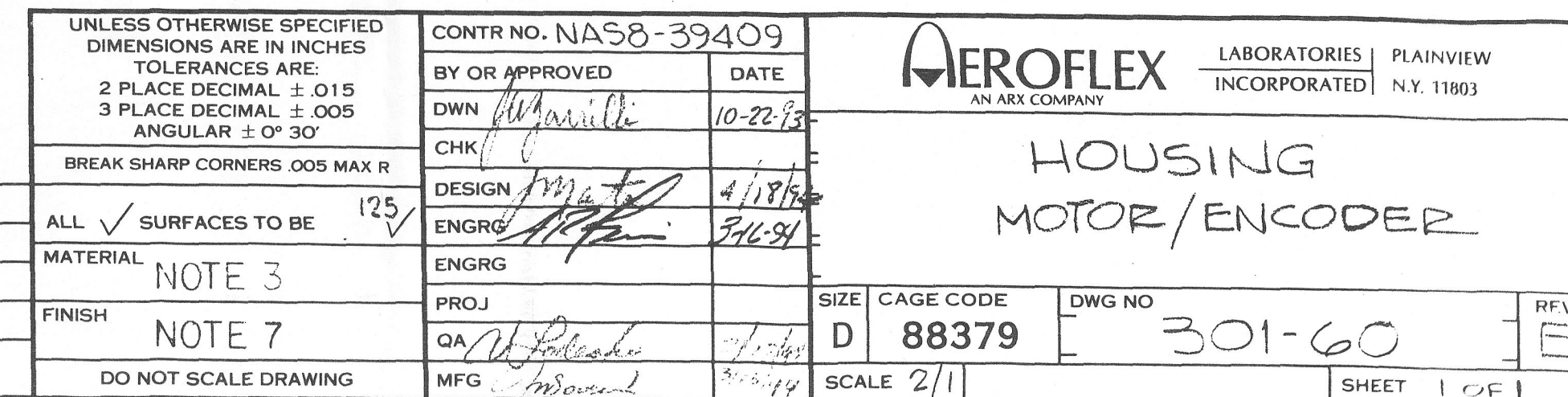
1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. ALL ASSEMBLY OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH 110P371, CONTAMINATION CONTROL AND IMPLEMENTATION PLAN AND 5-305-0 CLEANLINESS CONTROL PROCEDURE.
4. BOND AND STAKE TEMP REDUCER TO HOUSING PER 5-294-0.
5. ASSEMBLE AND ALIGN STATOR, ROTOR AND ENCODER IAW 5-297-0.
6. STAKE ALL FASTENERS USING STYCAST 2850 AND CAT 9 PER 5-068-0.
7. VACUUM BAKE MOTOR/ENCODER ASSY PER 5-298-0.
8. FUNCTIONAL TEST PRIOR TO FINAL ASSY PER ATP 20049.
9. ACCEPTANCE TEST IN ACCORDANCE WITH ATP 20049.
10. ADD SERIAL NUMBER, IN LOCATION INDICATED, USING .10 HIGH VERTICAL GOTHIC CHARACTERS. MARK PER MIL-STD-130, USING BLACK EPOXY INK PER MIL-I-43553, TYPE 1.
11. SOLDER WIRES FROM 21774, LED P.W. BOARD AND 21664 ENCODER P.W. BOARD USING ITEM 44 PER 532-2 CONNECTION DIAGRAM. SOLDER PER NHB 5300.4 (3A-2) USING QQ-5-571.
12. SEAL WIRE EXITS USING ITEM 45 PER 5-283-0.
13. TORQUE ALL MOUNTING HARDWARE TO 70 IN. OZ ± 5.


SEE SEPARATE PARTS LIST: PL 200-89

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO. NAS8-39409		AEROFLEX AN ARX COMPANY	
BREAK SHARP CORNERS .005 MAX R		BY OR APPROVED DWN [Signature]		LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803	
ALL ✓ SURFACES TO BE ✓		DATE 1-21-93		MOTOR / ENCODER ASSEMBLY	
MATERIAL 16187		CHK [Signature]			
FINISH 4		ENGRG [Signature]		SIZE D	
APPLICATION		PROJ [Signature]		CAGE CODE 88379	
DO NOT SCALE DRAWING		QA [Signature]		DWG NO 200-89	
		MFG [Signature]		REV E	
				SCALE: 2/1	
				SHEET 1 OF 1	



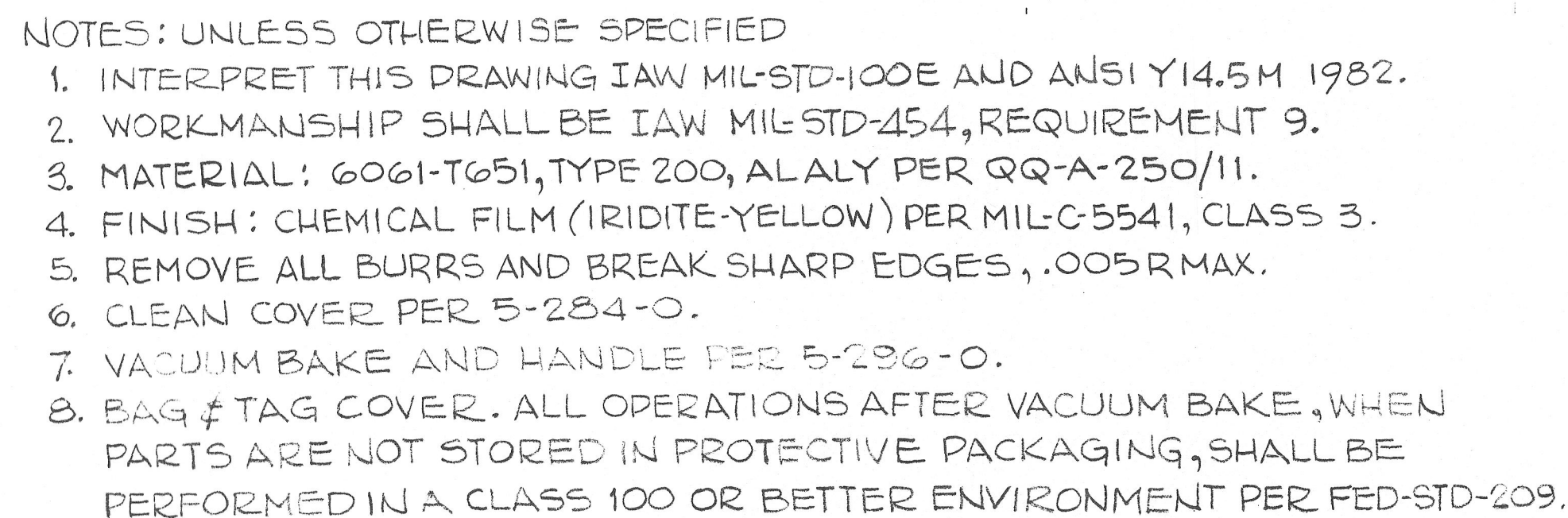
1. INTERPRET THIS DWG IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. MATERIAL: ITEM 1, 6061-T651 AL ALY PER QQ-A-250/11.
ITEM 2, CRES TYPE 435 PER AMS 5617 (REF).
4. REMOVE ALL BURRS AND SHARP EDGES .005R MAX.
5. BEFORE INSTALLING LINER (ITEM 2), CHILL LINER TO -40°F AND HEAT HOUSING (ITEM 1) TO +160°F. INSTALL LINER. AFTER PARTS NORMALIZE, FINISH MACHINE.
6. ALL SURFACES SHALL HAVE 125 MACHINE FINISH OR BETTER.
7. FINISH: CHEMICAL FILM ITEM 1 (IRIDITE-YELLOW) PER MIL-C-5541, CLASS 3.
PRIOR TO INSTALLATION OF ITEMS 2, 3 AND 4.
8. MARK PART NO. AND SERIAL NO., AS SHOWN, USING .12 HIGH VERTICAL GOTHIC CHARACTERS. MARK WITH BLACK EPOXY INK, PART NO. M43553-I-BLK, PER MIL-I-43553, TYPE 1.
9. CLEAN HOUSING PER 5-284-O.
10. VACUUM BAKE AND HANDLE PER 5-296-O.
11. BAG # TAG HOUSING. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT STORED IN PROTECTIVE PACKAGING, SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT PER FED-STD-209.




AEROFLEX

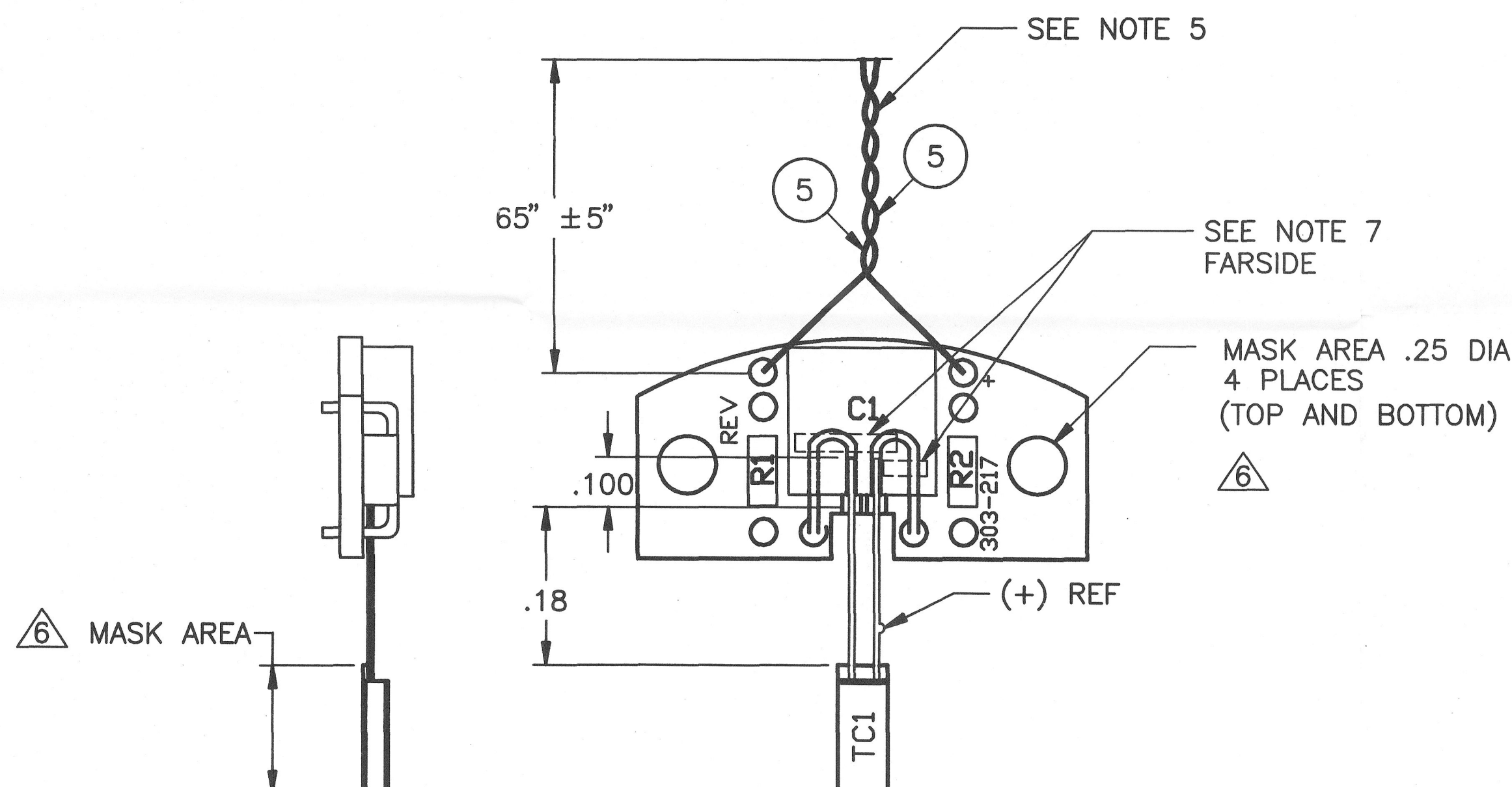
LABORATORIES
INCORPORATED

PLAINVIEW, NY 11803

[illegible]

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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE	5/13/94	A.F.
	B	REVISED PER ECN 11861	10-5-94	<i>[Signature]</i>



NOTES:

- USE PARTS LIST PL303-216 TO CROSS REFERENCE COMPONENT REFERENCE DESIGNATIONS TO ITEM NUMBERS.
- ASSEMBLY AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH NHB5300.4 (3K), PRINTED WIRING ASSEMBLIES AND THIS DRAWING.
- SOLDER TC1 TO PRINTED WIRING BOARD AND INSPECT SOLDER CONNECTION PRIOR TO INSTALLATION OF C1.
- SOLDER PER NHB 5300.4 (3A-2) USING QQ-S-571.
- AFTER SOLDERING THE TWISTED LEAD WIRES (ITEM 5), IDENTIFY THE (+) PLUS WIRE WITH A TEMPORARY MARKER (BY CHECKING CONTINUITY TO THE END MARKED + ON THE BOARD, USING A MEGOHMMETER)
- CONFORMAL COAT BOTH SIDES OF ASSEMBLED CIRCUIT CARD PER NHB 5300.4 (3J). MASK AREAS INDICATED.
- MARKING TO BE .06 HIGH GOTHIC CHARACTER PER MIL-STD-130 USING ITEM 6 EPOXY INK PER MIL-I-43553.
 - AFTER SERNO ADD FOUR DIGIT SERIAL NUMBER BEGINNING WITH 0001 RUNNING CONSECUTIVELY.
 - ADD REVISION STATUS OF THIS DRAWING.
- AFTER CONFORMAL COATING, VACUUM BAKE AND HANDLE PER 5-296-0

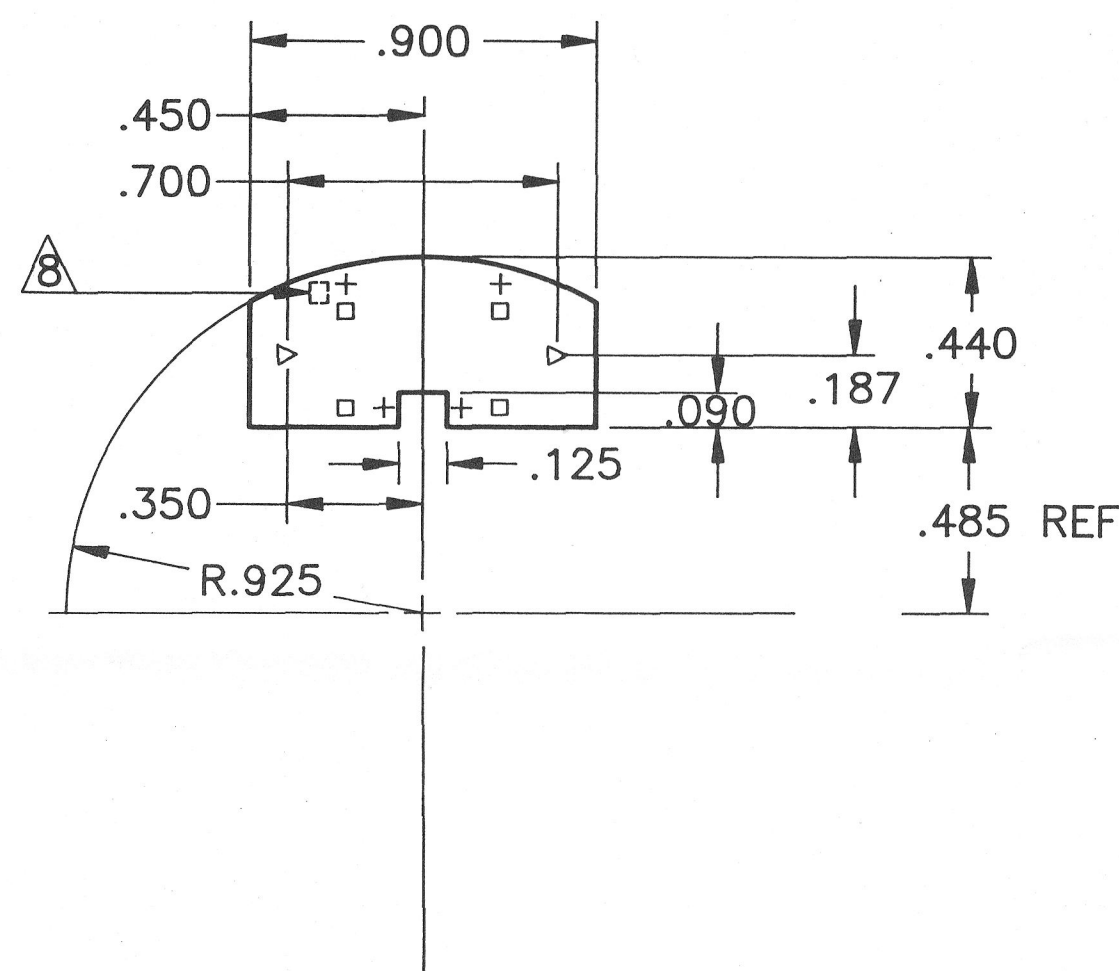
SEE SEPARATE P/L PL303-216

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ±.015 3 PLACE DECIMAL ±.005 ANGULAR ±0.30°		CONTR NO BY OR APPROVED DWN CHK DESIGN ENGRG ENGRG PROJ QA MFG		NAS8-39409 R. PAEZ 4/15/94 J. MARTIN 5/13/94 A. FERRI 5/13/94 C. LODESTRO 5/13/94 H. AHLHEIM 5/13/94	
BREAK SHARP CORNERS .005 MAX R		ALL SURFACES TO BE		AEROFLEX LABORATORIES INCORPORATED PLAINVIEW N.Y. 11803 TEMPERATURE TRANSDUCER FILTER CIRCUIT ASSEMBLY	
200-89	16187	MATERIAL		SIZE C	CAGE CODE 88379
NEXT ASSY	USED ON	FINISH		DWG NO 303-216	REV B
APPLICATION		DO NOT SCALE DRAWING		SCALE 4/1	SHEET

4 3 2 1

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE	5-10-94	<i>AEF</i>



NOTES:

1. INTERPRET THIS DRAWING IAW MIL-STD-00100D AND ANSI Y14.5M-1982.

2. MATERIAL:

PLASTIC SHEET, LAMINATED, COPPER CLAD,
PER MIL-P-13949, TYPE GFN 0460C2/C2B1B.

3. ALL PRINTED WIRING LAYERS ARE VIEWED FROM COMPONENT SIDE.

4. ARTWORK PATTERNS SHOWN ON SHEET 2 ARE COPIES
OF MASTER ARTWORK PATTERNS AND ARE USED FOR
DOCUMENTATION PURPOSES ONLY.

5. FINISH: ELECTRO DEPOSITED TIN LEAD, .003 THICK MINIMUM SN60 OR
SN63 PER QQ-S-571.
ELECTRO DEPOSITED TIN LEAD SHALL BE REFLOWED.

6. TARGETS ARE TO BE USED FOR ORIENTATION ONLY
AND NOT FOR REGISTRATION.

7. SILKSCREEN COMPONENT SIDE NOMENCLATURE USING SHEET 2.
MARK USING MARKING INK IAW MIL-I-43553 TYPE 1, COLOR WHITE INK.

8. MARK REVISION STATUS OF THIS DRAWING USING .040 HIGH VERTICAL GOTHIC
CHARACTERS SOLDER SIDE AS SHOWN BY ONE OF THE FOLLOWING METHODS:

- A) STAMP USING MARKING INK IAW MIL-I-43553 TYPE 1, WHITE INK.
B) ETCH ONTO SOLDER SIDE

9. LAYER TO LAYER PATTERN REGISTRATION SHALL BE WITHIN $\pm .005$

10. FINISHED PRINTED WIRING BOARD SHALL BE IN
ACCORDANCE WITH NHB5300.4 (3I).

HOLE LEGEND		
SYMBOL	DESCRIPTION	QTY
\square	.028 \pm .003 DIA AFTER PLATING	4
+	.035 \pm .003 DIA AFTER PLATING	4
\triangle	.104 \pm .003 DIA UNPLATED	2

A	A															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
REVISION STATUS OF SHEETS																
SHEET ONE REVISION STATUS IS THE IDENTIFYING REVISION FOR THIS MULTISHEET DRAWING																

SEE OUTSTANDING ECN (s) 11858

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^{\circ} 30'$		CONTR NO. NASB-39409	BY OR APPROVED		DATE
BREAK SHARP CORNERS .005 MAX R		DWN	R. PAEZ	04/15/94	
ALL \checkmark SURFACES TO BE		CHK			
MATERIAL NOTE 2		DESIGN	<i>Am...</i>	5/13/94	
FINISH NOTE 3		ENGRG	<i>...</i>	05/10/94	
DO NOT SCALE DRAWING		ENGRG			
APPLICATION		PROJ	<i>...</i>	5/10/94	
		QA	<i>...</i>	5/13/94	
		MFG	<i>...</i>		

AEROFLEX		LABORATORIES	PLAINVIEW
AN ARX COMPANY		INCORPORATED	N.Y. 11803
PRINTED WIRING BOARD			
TEMPERATURE TRANSDUCER FILTER			
SIZE	CAGE CODE	DWG NO	REV
C	88379	303-217	A
SCALE 2/1		SHEET 1 OF 2	

4

3

2

1

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE	5-10-94	mf

D

C

B

A

I

C

DWG. NO.

303-217

SH

2

REV.

A

A

LAYER 1 COMPONENT SIDE
303-217 REV A
VIEWED FROM COMPONENT SIDE

303-217 REV A
VIEWED FROM COMPONENT SIDE

SOLDERMASK
303-217 REV A
VIEWED FROM COMPONENT SIDE

SILKSCREEN TOP
303-217 REV A
VIEWED FROM COMPONENT SIDE

SIZE	CAGE CODE	DWG NO	REV
C	88379	303-217	A
SCALE 1/1		SHEET 2	

4

3

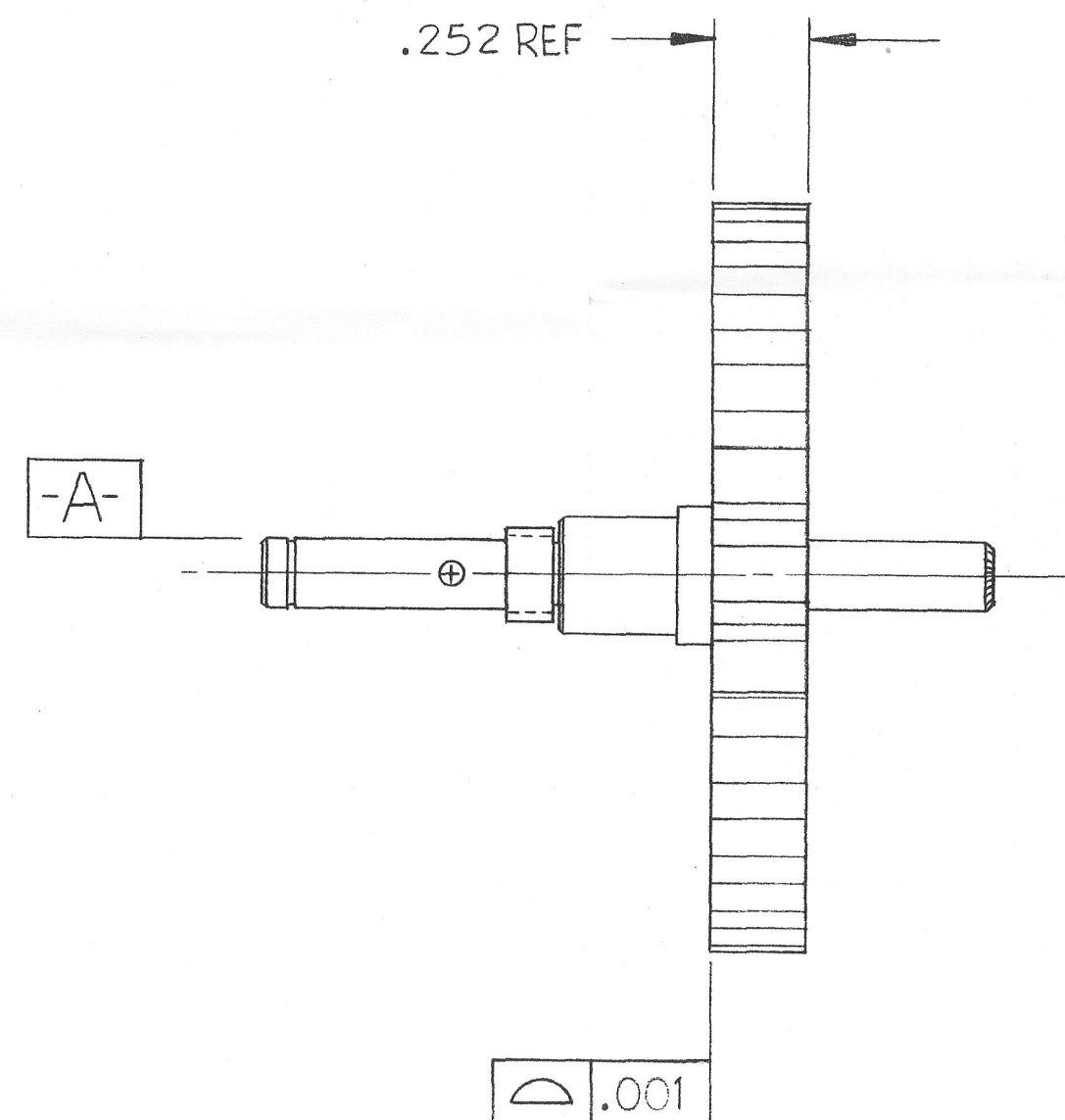
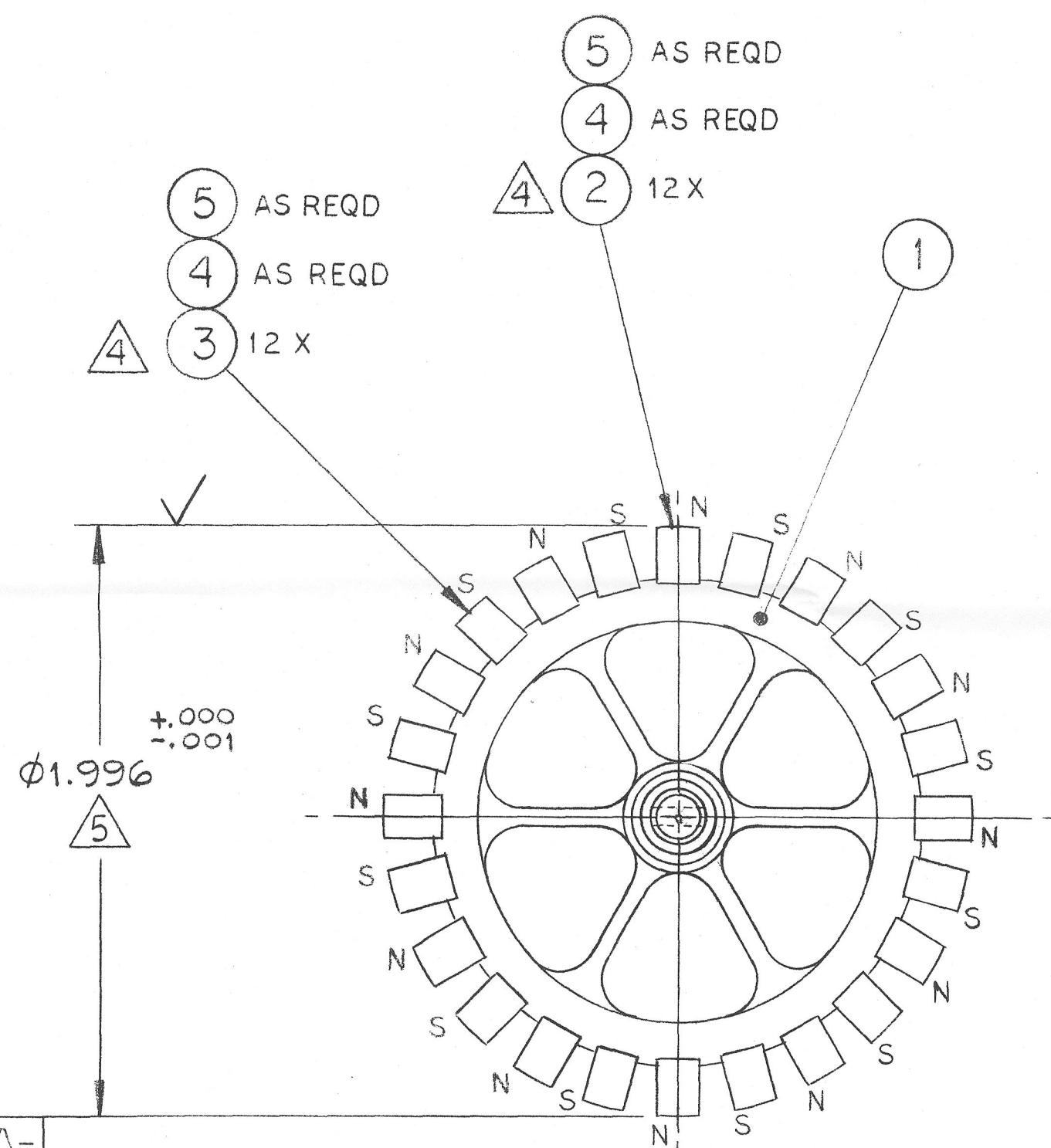
2

1

ARX 4 B5

PROPRIETARY
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE	5-13-94	APF
	B	REVISED PER ECN 11861	6-16-94	APF
	C	REVISED PER ECN 11862	11-30-94	APF




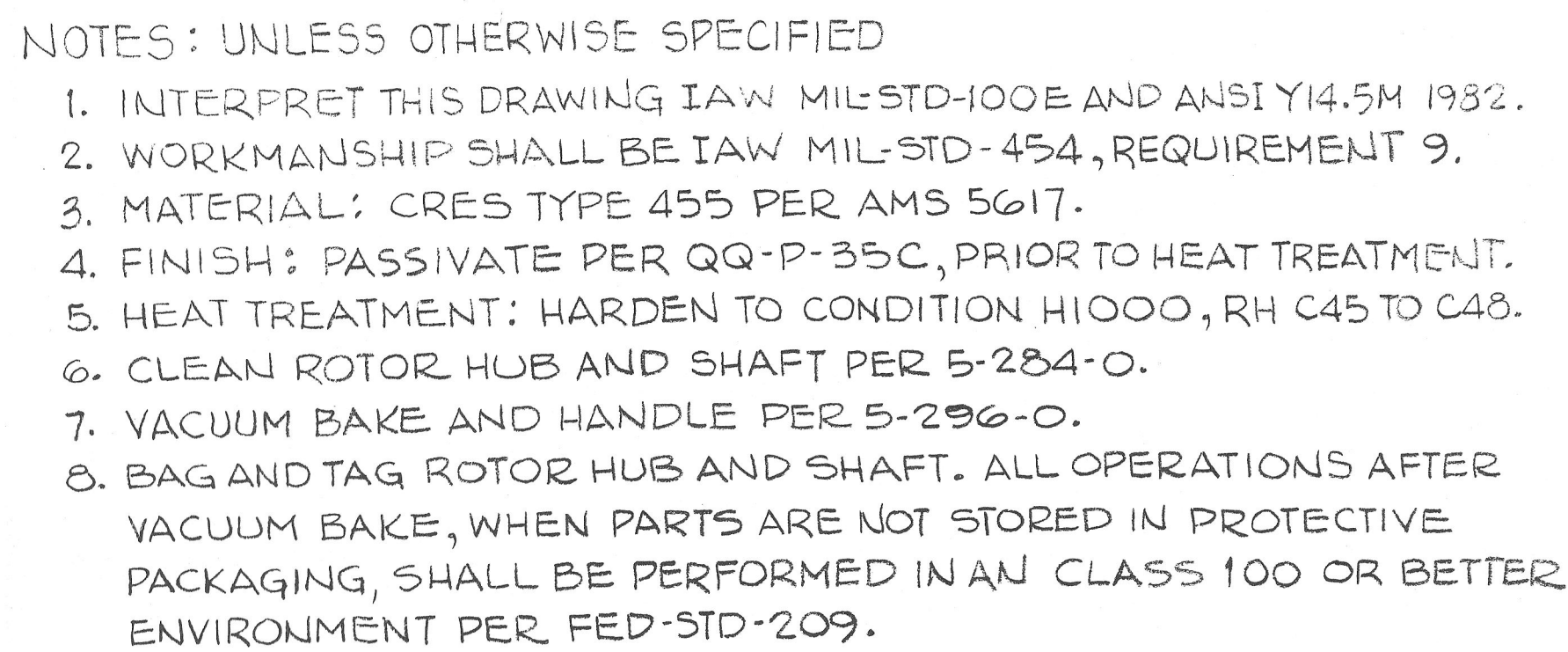
NOTES: UNLESS OTHERWISE SPECIFIED

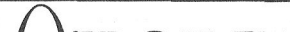
1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. CLEAN ROTOR HUB PER 5-284-0 PRIOR TO BONDING MAGNETS.
4. BOND MAGNETS (ITEMS 2 AND 3) TO ROTOR HUB (ITEM 1) USING ITEM 5 (612-20) PER 960-229, CURE CYCLE d.
5. GRIND O.D. OF ROTOR ASSEMBLY TO DIMENSION SHOWN IF REQUIRED TO MEET O.D. DIMENSION. MAGNETS SHALL BE IAW 5-258-0.
6. AFTER MACHINING AND BONDING OF MAGNETS TO THE ROTOR HUB, CLEAN ASSEMBLY PER 5-134-0 AND COAT ALL EXPOSED SURFACES OF MAGNETS WITH ITEM 4 (612-3) PER 960-251.
7. VACUUM BAKE AND HANDLE PER 5-296-0.
8. BAG AND TAG ROTOR ASSEMBLY. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT STORED IN PROTECTIVE PACKAGING, SHALL BE PERFORMED IN AN CLASS 100 OR BETTER ENVIRONMENT PER FED-STD-209.

SEE SEPARATE PARTS LIST: PL 400-29-6

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO. NA58-39409		BY OR APPROVED		DATE	
BREAK SHARP CORNERS .005 MAX R		CHK		DWN		10-26-93	
ALL SURFACES TO BE		DESIGN		ENGRG		5/13/94	
200-89 16187		MATERIAL		ENGRG		5/13/94	
NEXT ASSY USED ON		FINISH		PROJ		5-13-94	
APPLICATION		DO NOT SCALE DRAWING		QA		5-13-94	
				MFG		5-13-94	
				SIZE		CAGE CODE	
				C		88379	
				DWG NO		400-29-6	
				SCALE		2/1	
				SHEET		1 OF 1	

NASB-39409		 AEROFLEX AN ARX COMPANY		LABORATORIES	PLAINVIEW
PROVED	DATE			INCORPORATED	N.Y. 11803
Garrett	10-19-73	ROTOR HUB AND SHAFT			
M46	5/3/94				
3/6/94					
Adelste	3/7/94	SIZE	CAGE CODE	DWG NO	REV
Movast	3/6/94	C	88379	402-29-9	B
SCALE: 2/1		SHEET 1 OF 1			



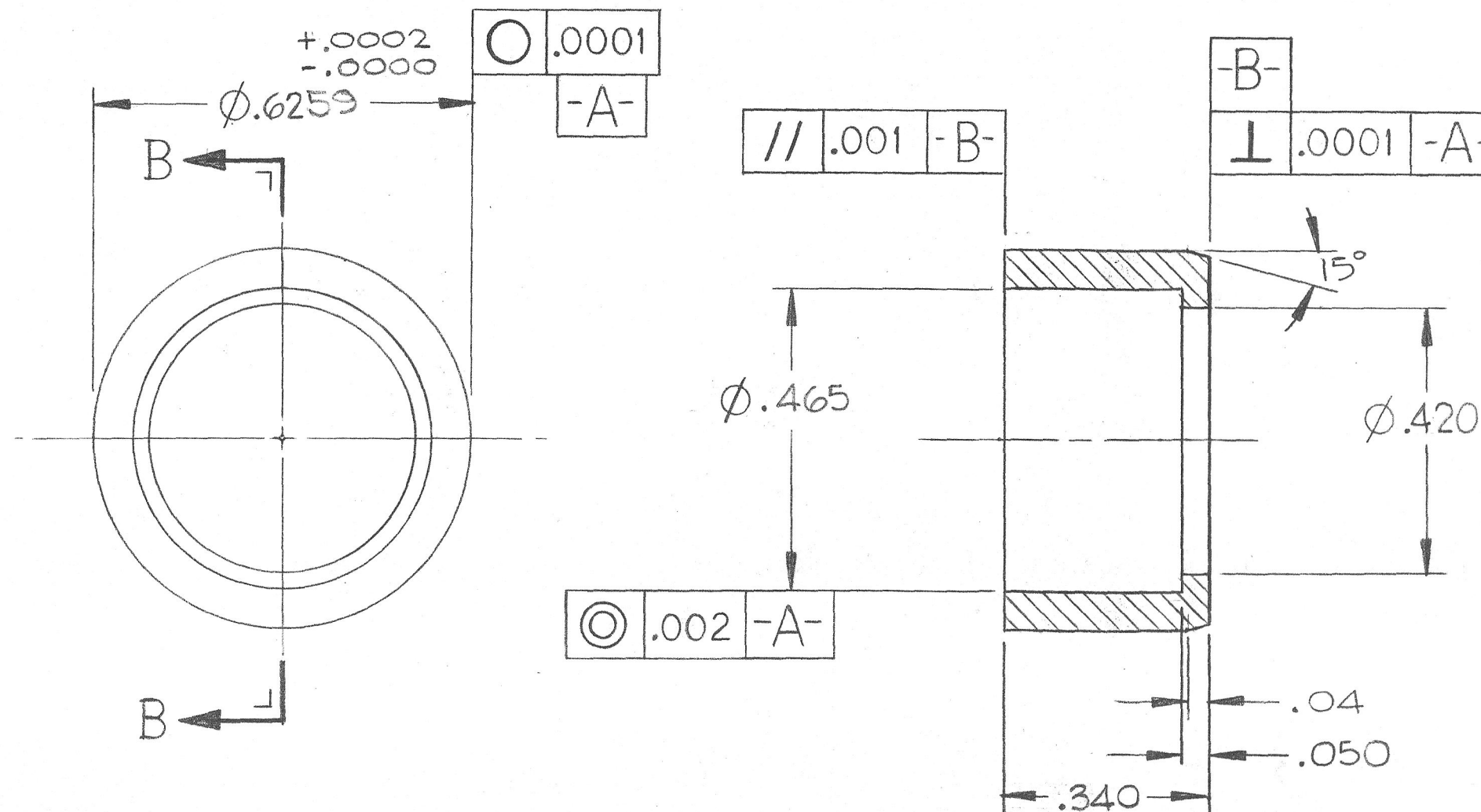
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO NAS8-39409		 LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803	
BREAK SHARP CORNERS .005 MAX R		BY OR APPROVED	DATE	ROTOR HUB AND SHAFT	
ALL ✓ SURFACES TO BE 100✓		DWN <i>Manville</i>	10-19-93		
MATERIAL NOTE 3		CHK <i>[Signature]</i>	5/8/94		
FINISH NOTE 4 & 5		DESIGN <i>[Signature]</i>	5/8/94		
400-29-6 16187		ENGRG <i>[Signature]</i>	3-16-94	SIZE C	
NEXT ASSY USED ON		ENGRG		CAGE CODE 88379	
APPLICATION		PROJ		DWG NO 402-29-9	
DO NOT SCALE DRAWING		QAC <i>[Signature]</i>	7/1/94	REV B	
		MFG <i>[Signature]</i>	3/4/94	SCALE 1/2/1	
				SHEET 1 OF 1	

PROPRIETARY

EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF AEROFLEX LABORATORIES INC. AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE AEROFLEX EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED-TO-KNOW WHO BY THE USE HEREOF ACKNOWLEDGE AEROFLEX OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	3-16-94	<i>[Signature]</i>



SECTION BB

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. MATERIAL: CRES TYPE 455 PER AMS 5617.
3. FINISH: PASSIVATE PER QQ-P-35C, PRIOR TO HEAT TREATMENT.
4. HEAT TREATMENT: HARDEN TO CONDITION H1000, RH C45 TO C48.
5. BAG AND TAG PER MIL-STD-130.

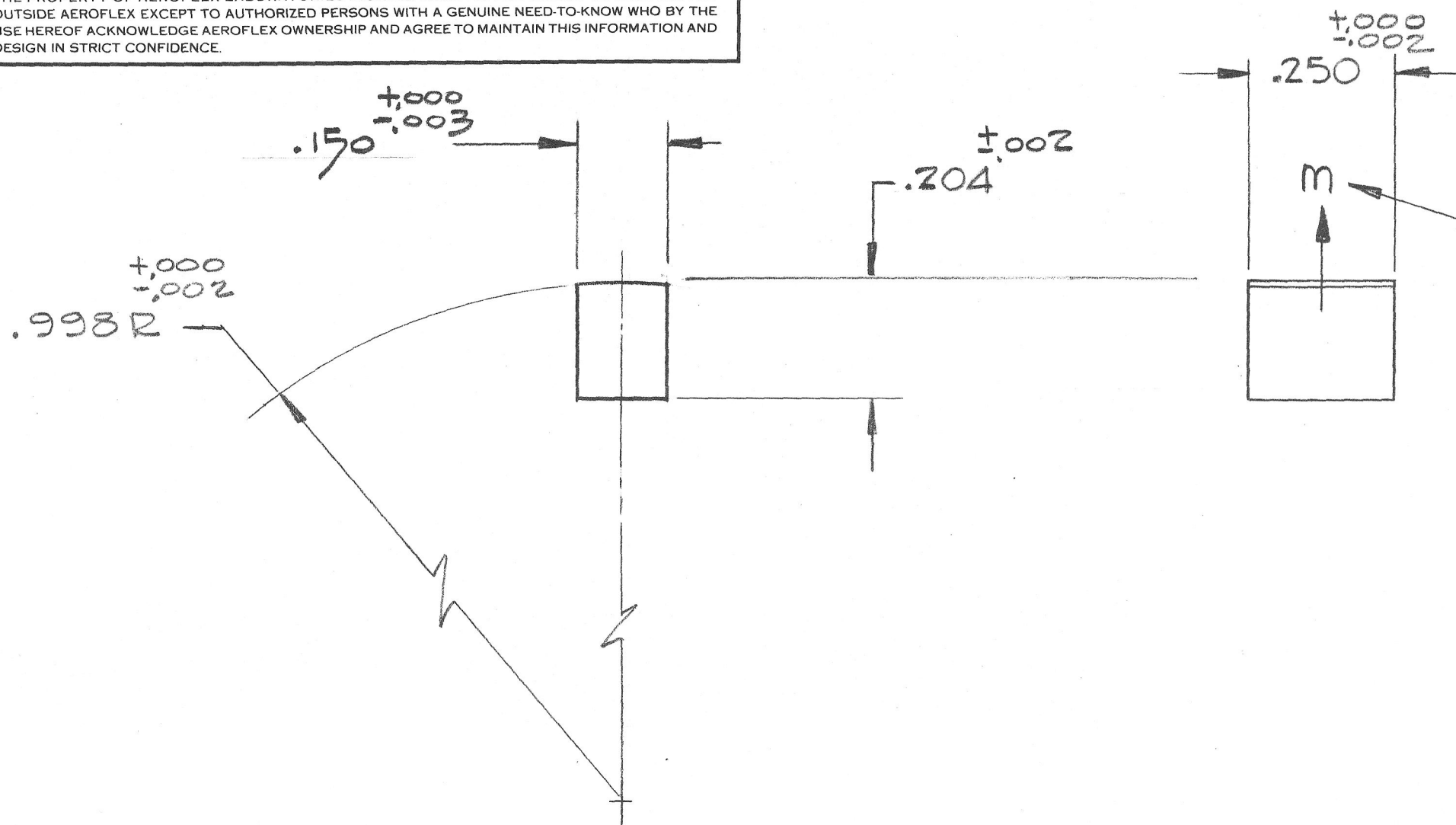
301-60	16187
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^\circ 30'$		CONTR NO NAS 8-39409	
BREAK SHARP CORNERS .005 MAX R		BY OF APPROVED <i>[Signature]</i>	DATE 10-24-9
ALL \checkmark SURFACES TO BE ¹²⁵ \checkmark		CHK <i>[Signature]</i>	
MATERIAL NOTE 2		DESIGN <i>[Signature]</i>	5/13/9
		ENGRG <i>[Signature]</i>	3-16-9
FINISH NOTES 3 & 4		ENGRG	
DO NOT SCALE DRAWING		PROJ	
		QA <i>[Signature]</i>	3/17/9
		MFG <i>[Signature]</i>	3/16/9

AEROFLEX LABORATORIES PLAINVIEW
AN ARX COMPANY INCORPORATED N.Y. 11803

PROPRIETARY
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE.	7-23-93	<i>fit</i>
B	ECN 11824	8/20/93	I.H.



NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW MIL-STD-100 E
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. MATERIAL: SAMARIUM COBALT 26×10^6 GAUSS OERSTED ENERGY PRODUCT.
4. PARTS SHALL BE FREE OF CRACKS, CHIPS AND FLAWS. INSPECT PER 5-258-0.

↑ - 3		MAGNETIZED "SOUTH"	
- 2		"NORTH"	
411-291-1		NOT MAGNETIZED.	
PART N°		"M" DESCRIPTION	
CONTR NO NAS8-39409		<div>AEROFLEX</div> <div>AN ARX COMPANY</div> <div>LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803</div>	
BY OF APPROVED			
DWN <i>Engrg</i>		MAGNET	
CHK			
DESIGN <i>Mark</i>		SIZE CAGE CODE DWG NO	
ENGRG <i>Engrg</i>			
ENGRG		B 88379 411-291-*	
PROJ			
QA <i>Engrg</i>		REV B	
MFG <i>msoukalis</i>			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^\circ 30'$	
BREAK SHARP CORNERS .005 MAX R	
ALL <input checked="" type="checkbox"/> SURFACES TO BE <input checked="" type="checkbox"/>	
MATERIAL NOTE 3	
FINISH	
DO NOT SCALE DRAWING	
400-29-6	16187
NEXT ASSY	USED ON
APPLICATION	

4

3

2

1

PROPRIETARY
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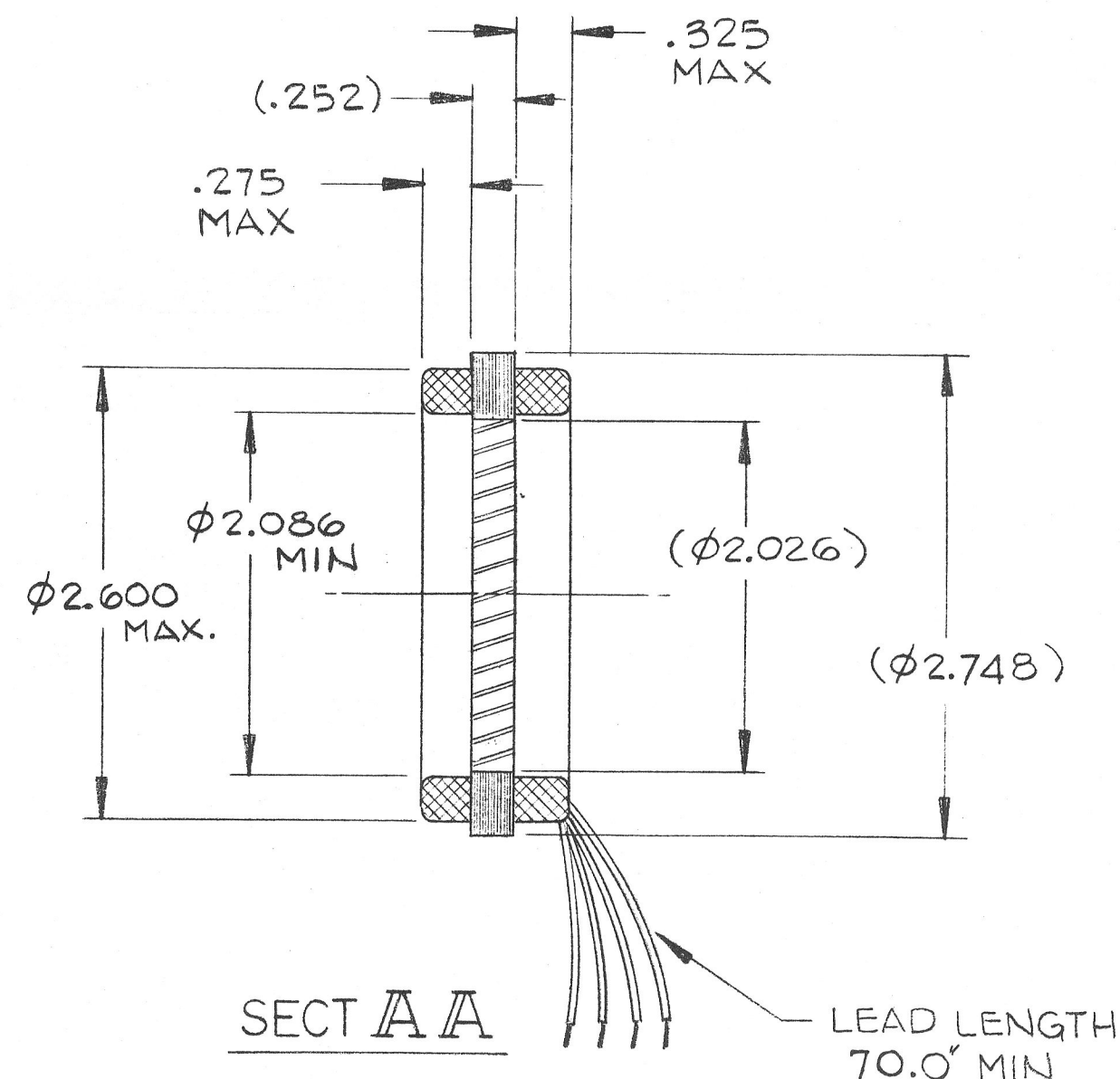
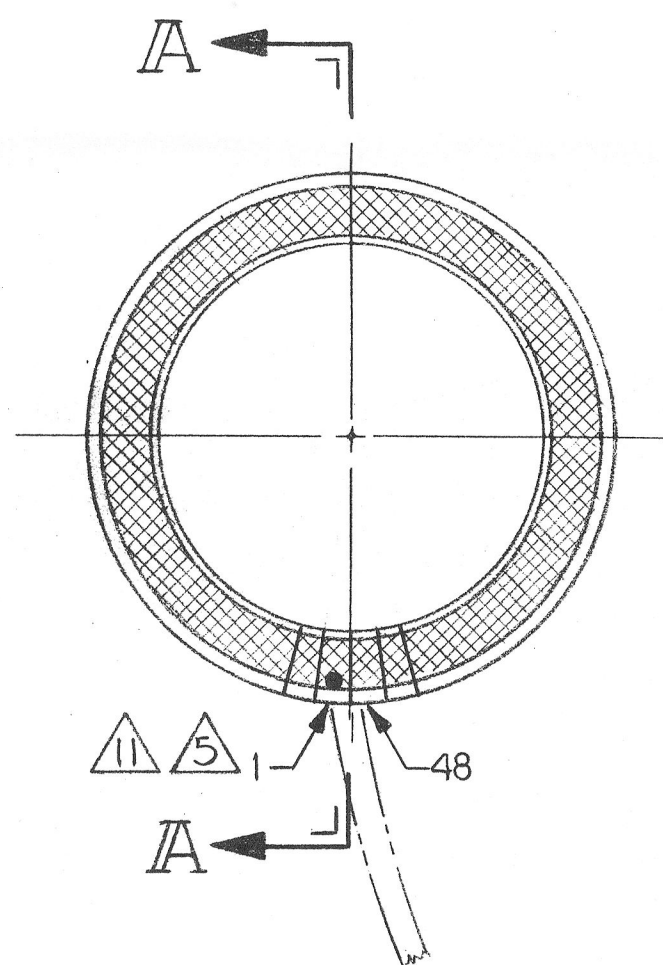
INSERT PER 520 - 248
COIL WINDING 521 - 425
FINISH DATA 522 - 472
CORE 502 - 29-9
MAGNET WIRE M1177/14-01C034

TAPE 507 - 39-25
CORD 508 - 22-7
LEADS M 22759/18-[26]-9 (WHITE)
LEAD EXTENSION 70 IN. MIN
IMPREGNATION SCOTCHCAST 280 PARTS A#B

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE	5-13-94	ARF
	C	REVISED PER ECU 11861	10-5-94	ARF

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. CLEAN COILS PER 5-130-0 PRIOR TO INSERTION.
4. CLEAN STATOR CORE PER 5-128-0 PRIOR TO INSERTION.
5. SLOT NUMBER 1 SHALL BE IDENTIFIED WITH A BLACK DOT USING EPOXY INK, PART NUMBER M43553-I-BLK.
6. SOLDER CONNECTIONS PER NHB 5300.4 (3A-2) USING SOLDER PER QQ-S-571, Sn60WRMAP3.
7. FORM COIL HEADS TO DIMENSIONS SHOWN.
8. PRIOR TO IMPREGNATION, CHECK WINDING RESISTANCE PER ATP 20049, PARA 3.2.2.
9. IMPREGNATE WINDINGS WITH SCOTCHCAST 280, PARTS A #B PER 5-071-0.
10. AFTER IMPREGNATION, CHECK DIELECTRIC STRENGTH AND INSULATION RESISTANCE PER ATP 20049, PARA 3.2.4.1.
11. LEAD WIRE CONNECTION SHALL EMANATE IN APPROXIMATE AREA OF SLOT 1.
12. FINAL CLEAN STATOR ASSY PER 5-129-0.
13. VACUUM BAKE AND HANDLE PER 5-296-0.
14. BAG AND TAG STATOR ASSY. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT STORED IN PROTECTIVE PACKAGING, SHALL BE PERFORMED IN A CLASS 100 OR BETTER ENVIRONMENT PER FED-STD-209.



SECTION A-A

LEAD LENGTH
70.0 MIN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CB															
REVISION STATUS OF SHEETS															
SHEET ONE REVISION STATUS IS THE IDENTIFYING REVISION FOR THIS MULTISHEET DRAWING															

SEE SEPARATE PARTS LIST: PL 500-29-9

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± 0.15 3 PLACE DECIMAL ± 0.05 ANGULAR ± 0° 30'		CONTR NO NAS8-39409		BY OR APPROVED		DATE		AEROFLEX LABORATORIES PLAINVIEW AN ARX COMPANY INCORPORATED N.Y. 11803	
200-89		16187		DWN		10-9-93		STATOR ASSEMBLY	
NEXT ASSY		USED ON		CHK		5-13-94		SIZE	
APPLICATION		MATERIAL		DESIGN		5-13-94		CAGE CODE	
		FINISH		ENGRS		5-13-94		DWG NO	
		DO NOT SCALE DRAWING		PROJ		5-13-94		88379	
				QA		5-13-94		500-29-9	
				MFG		5-13-94		SCALE: 1/1	
								SHEET 1 OF 2	

4

3

2

1

4

3

2

1

PROPRIETARY
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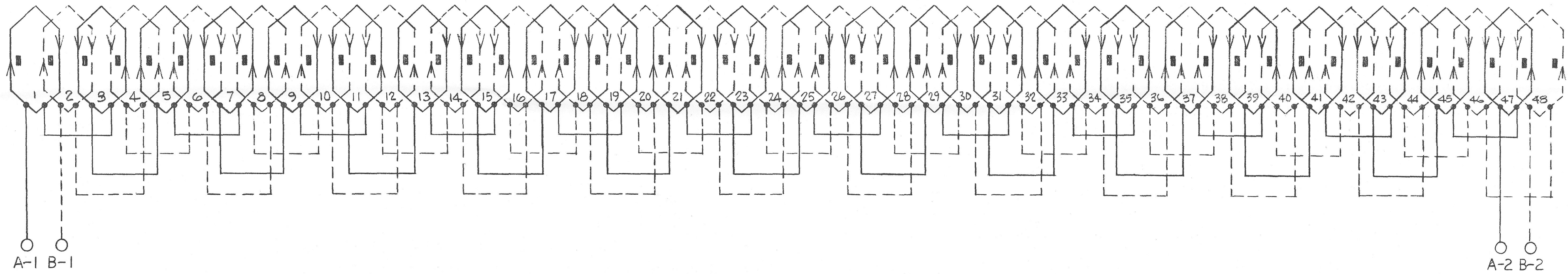
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	B	SEE SHEET 1	5-13-94	ALF

D

C

B

A



DIAMOND WIRING DIAGRAM

SHEET ONE REVISION STATUS IS THE IDENTIFYING REVISION FOR THIS MULTISHEET DRAWING

SIZE	FSCM NO	DWG NO	REV
C	88379	500-29-9	B
SCALE		SHEET 2 OF 2	

4

3

2

1

500-29-9 1 of 2 B

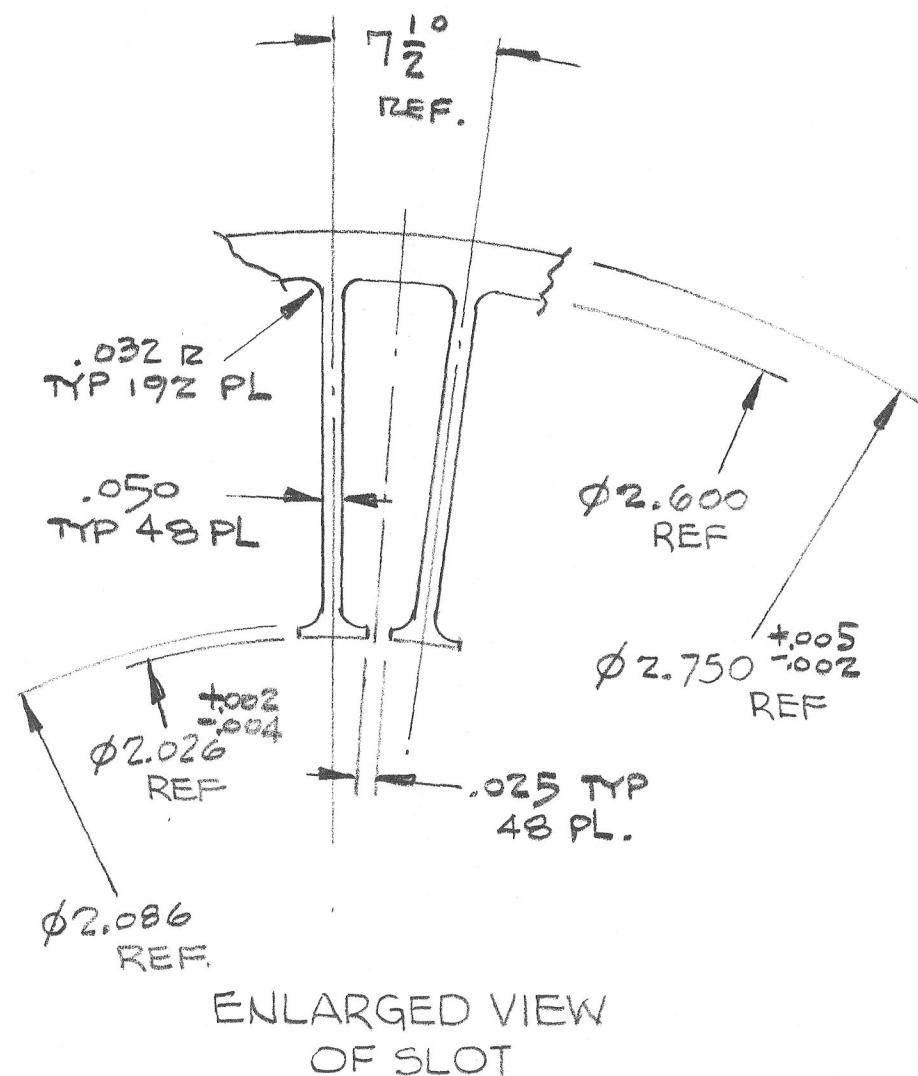
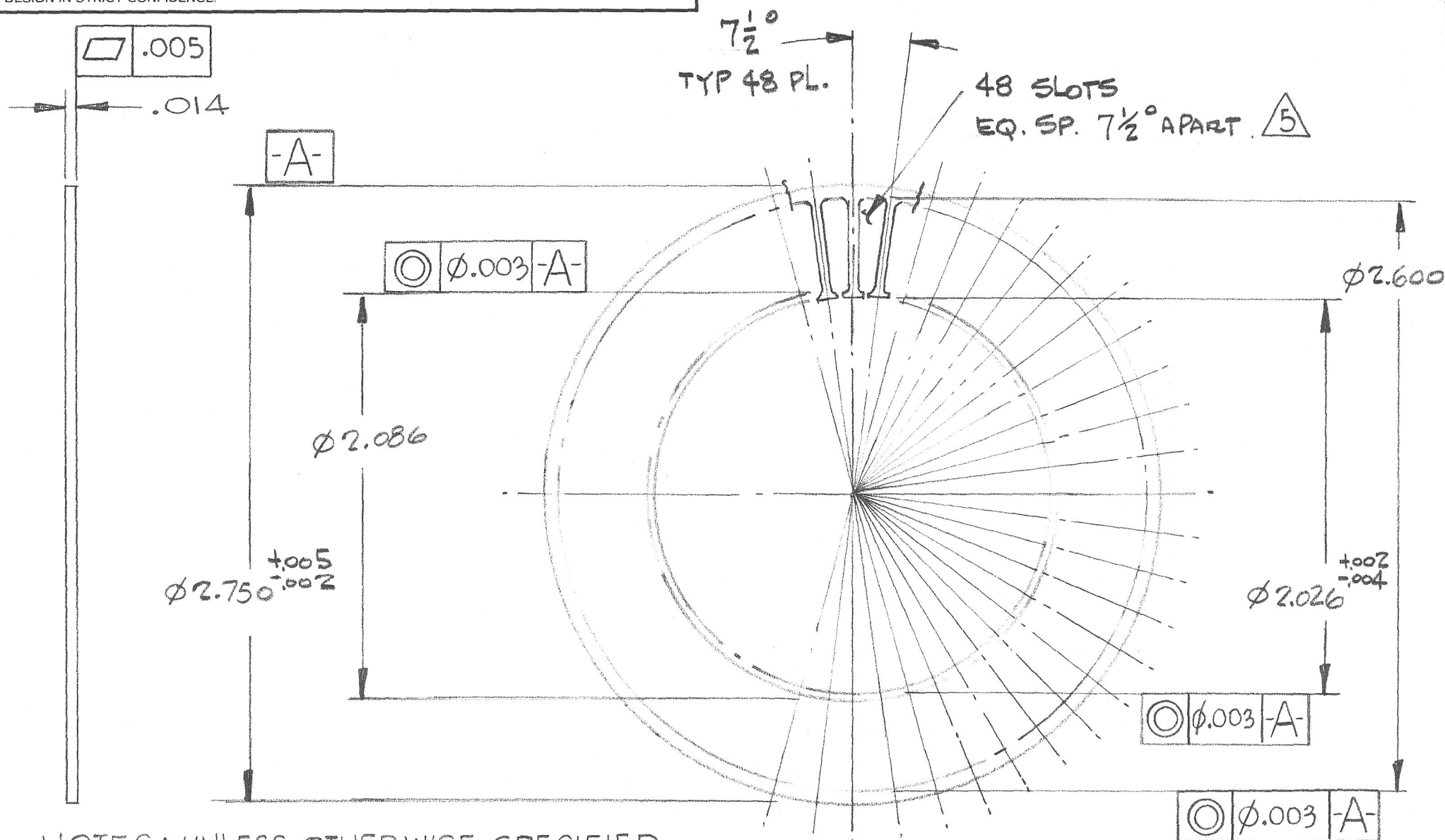
PROPRIETARY
EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF AEROFLEX LABORATORIES INC. AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE AEROFLEX EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED-TO-KNOW WHO BY THE USE HEREOF ACKNOWLEDGE AEROFLEX OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

512-11-14

8

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE.	7/23/93	<i>[Signature]</i>
B	REVISED PER ECN 11824 8/24/93	11/05/93	<i>[Signature]</i>



NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQUIREMENT 9.
3. MATERIAL: ELECTRICAL STEEL, M19 WITH CORE PLATE C-5 (.014 THK)
4. DIMENSIONS APPLY PRIOR TO ANNEALING.
5. SLOT SPACING WITHIN 0° 8', NON-CUMULATIVE.
6. BURRS TO BE LESS THAN .002.

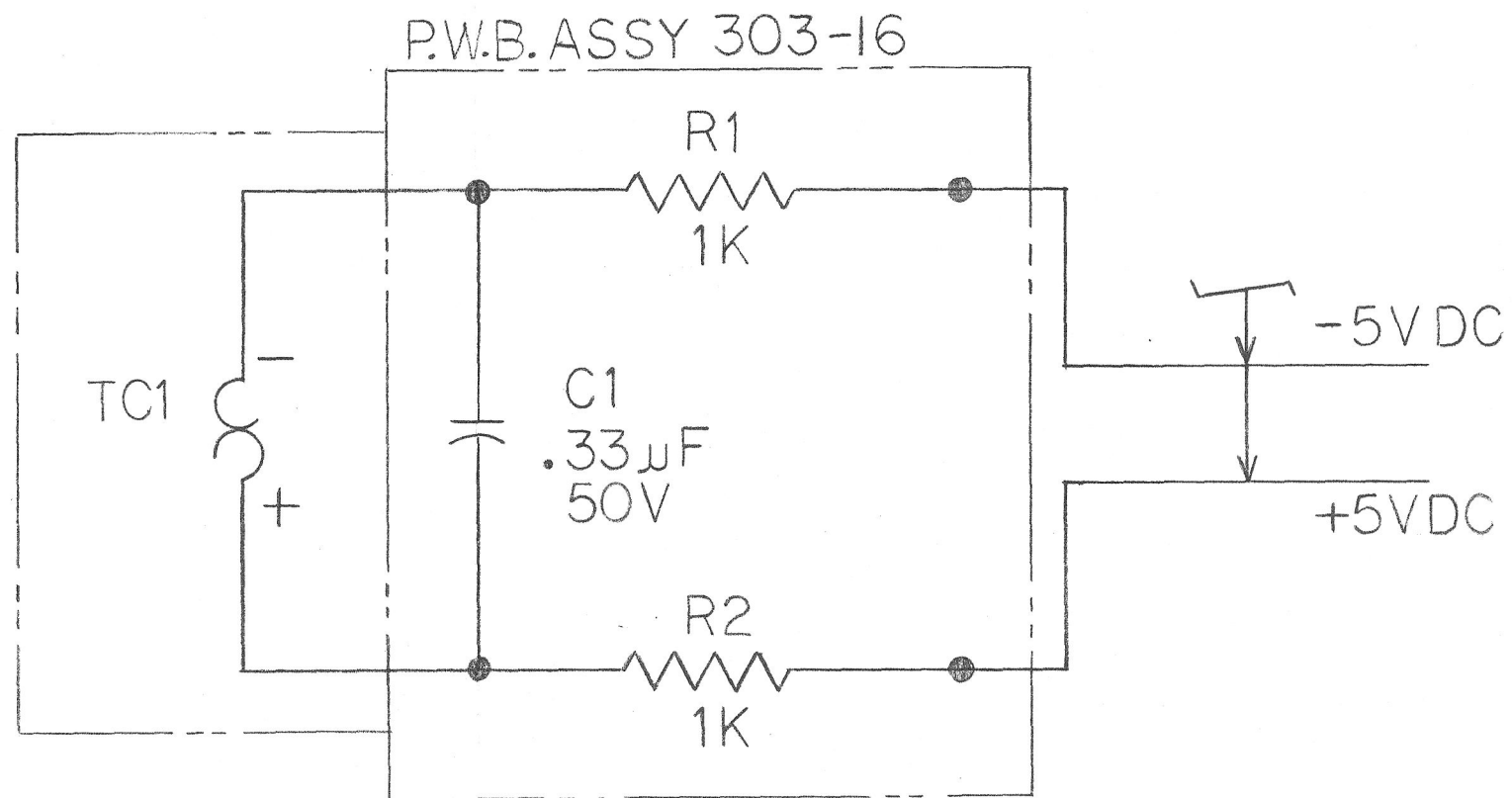
502-29-9	16187
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO NAS8-39409
BY OF APPROVED	DATE	
DWN <i>[Signature]</i>		
CHK		
DESIGN <i>[Signature]</i>	7/23/93	
ENGRG <i>[Signature]</i>	7/23/93	
ENGRG		
PROJ <i>[Signature]</i>	7/23/93	
QA <i>[Signature]</i>	7/23/93	
MFG THEON SOUKARIS	7/22/93	

AEROFLEX AN ARX COMPANY		LABORATORIES INCORPORATED	PLAINVIEW N.Y. 11803
LAMINATION			
SIZE B	CAGE CODE 88379	DWG NO 512-11-14	REV B
SCALE 1:1		SHEET 1 OF 1	

PROPRIETARY
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	5-13-94	MTF



NOTES:

1. INTERPRET DWG IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. RESISTOR VALUES ARE IN OHMS, $\frac{1}{8}W$, $\pm 5\%$.
3. CAPACITANCE VALUE IS IN MICROFARADS, $\pm 10\%$.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^\circ 30'$		CONTR NO NAS 8-39409	
		BY OR APPROVED	DATE
BREAK SHARP CORNERS .005 MAX R		DWN <i>[Signature]</i>	5/10/94
ALL <input checked="" type="checkbox"/> SURFACES TO BE <input checked="" type="checkbox"/>		CHK <i>[Signature]</i>	5/13/94
MATERIAL		ENGRG <i>[Signature]</i>	5-11-94
FINISH		PROJ <i>[Signature]</i>	5-13-94
DO NOT SCALE DRAWING		QA <i>[Signature]</i>	5-13-94
MFG <i>[Signature]</i>		5-13-94	

AEROFLEX AN ARX COMPANY		LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803	
SCHEMATIC DIAGRAM TEMP XDCR FLTR CKT			
SIZE B	CAGE CODE 88379	DWG NO 531-56	REV A
SCALE		SHEET 1 OF 1	

PROPRIETARY

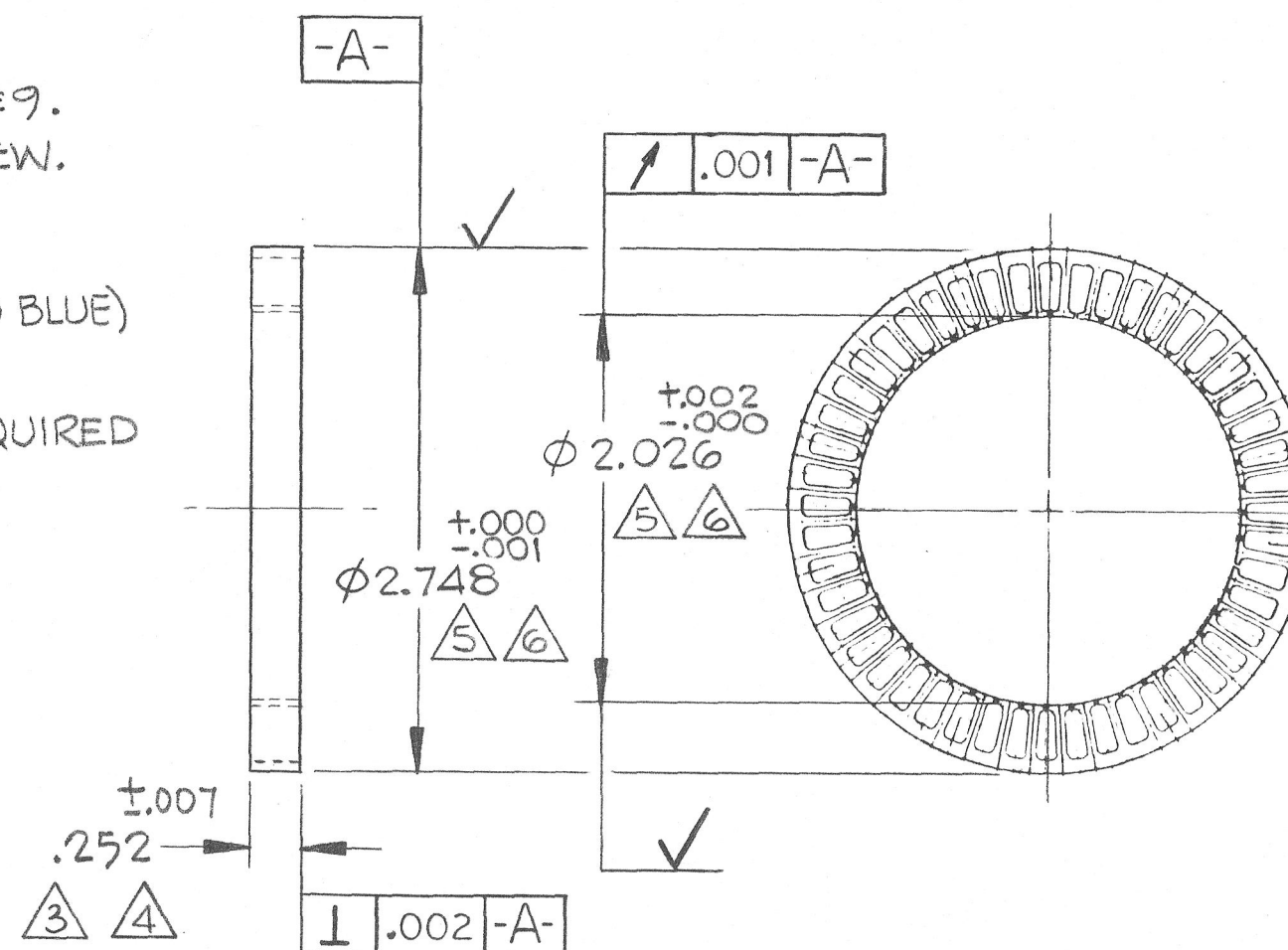
EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF AEROFLEX LABORATORIES INC. AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE AEROFLEX EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED-TO-KNOW WHO BY THE USE HEREOF ACKNOWLEDGE AEROFLEX OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	5-13-94	<i>prt</i>
C	UP Rev Per Plc ECU11861	9-14-94	<i>Ant</i>

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ 5 #9.
3. RANDOMLY STACK LAMINATIONS WITH ONE (1) SLOT SKEW.
4. CEMENT LAMINATIONS WITH 612-3 PER 960-251.
5. FLUIDIZE BED COAT WITH 612-54 (SCOTCHCAST 5230 BLUE) PER 5-222-0. MASK O.D. AND I.D.
6. MACHINE OUTSIDE AND INSIDE DIAMETERS AS REQUIRED TO MEET DIMENSIONS (CLEAN-UP ONLY).
7. CLEAN LAMINATION ASSEMBLY PER 5-128-0.

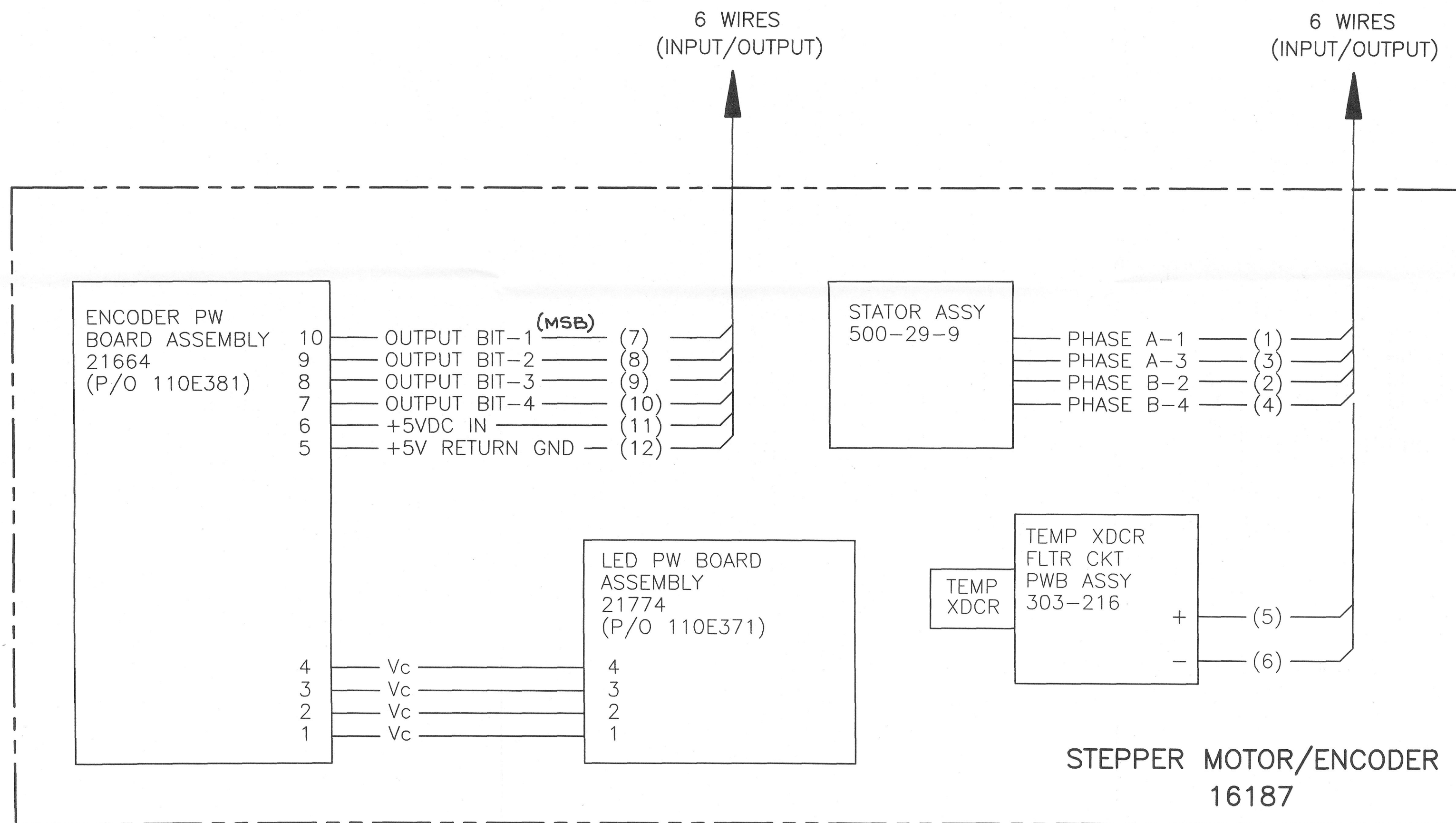


SEE SEPARATE PARTS LIST: PL 502-29-9

500-29-9 NEXT ASSY		16187 USED ON		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO NAS8-39409		AEROFLEX AN ARX COMPANY		LABORATORIES INCORPORATED		PLAINVIEW N.Y. 11803			
				BREAK SHARP CORNERS .005 MAX R		BY OR APPROVED <i>Sanilli</i>		DATE 1-24-94		STATOR CORE					
500-29-9		16187		ALL ✓ SURFACES TO BE ✓		CHG <i>Ant</i>		ENGRG <i>Ant</i>		SIZE B		CAGE CODE 88379		DWG NO 502-29-9	
APPLICATION		FINISH		DO NOT SCALE DRAWING		PROJ <i>Ant</i>		QA <i>Ant</i>		SCALE: FULL		REV C		SHEET 1 OF 1	

PROPRIETARY
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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE	5/13/94	ARF
	C	REVISED PER ECN 11861	10-5-94	ARF



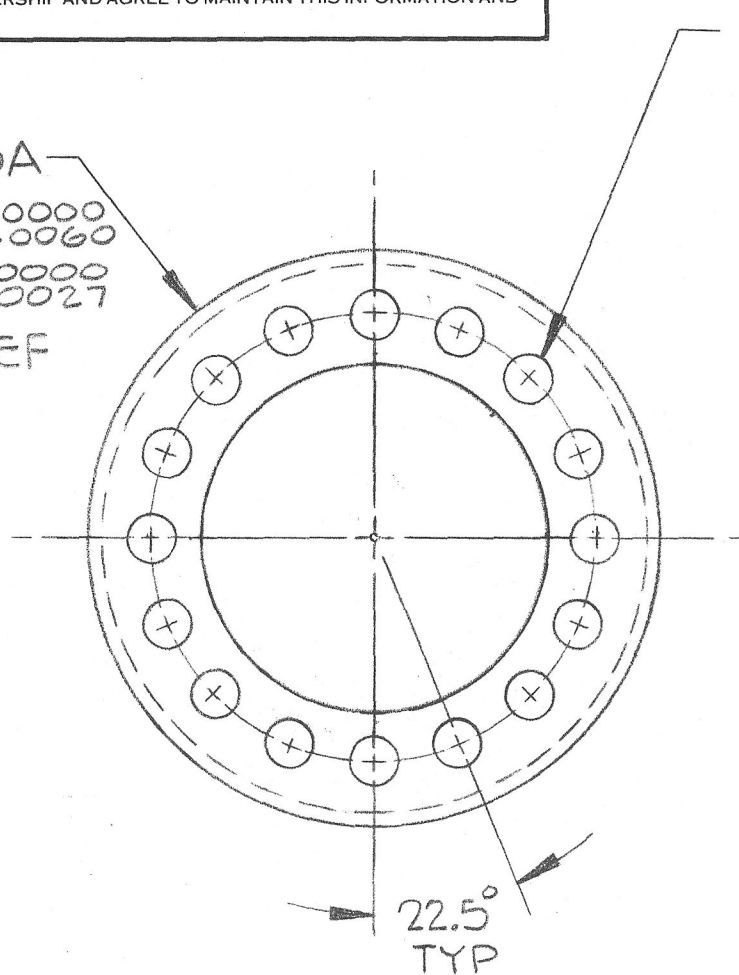
NOTE:
1. WIRE NUMBERS (1) THRU (12) ARE FOR REFERENCE ONLY.
MARKERS ARE TO BE REMOVED AT FINAL ASSEMBLY BY CUSTOMER.

<div>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ±.015 3 PLACE DECIMAL ±.005 ANGULAR ±0.30°</div>		CONTR NO		<div>AEROFLEX AN ARFX COMPANY</div>		LABORATORIES INCORPORATED		PLAINVIEW N.Y. 11803	
		BY OR APPROVED				DATE			
		DWN Carmine Martino		2/3/94		CONNECTION DIAGRAM			
		CHK							
		DESIGN J. Martin		5/13/94					
		ENGRG							
		MATERIAL		ENGRG		SIZE C CAGE CODE 88379 DWG NO 532-2 REV C			
200-89		16187		PROJ A.F. Jones 5/13/94					
NEXT ASSY		USED ON		QA C.V. Lodestro 5/13/94		SCALE NONE SHEET			
APPLICATION		DO NOT SCALE DRAWING		MFG H. M. M. M. 5/13/94					

PROPRIETARY
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.7500-32UNS - 3A
MAJOR $\phi = .7489 \pm .0000$
PITCH $\phi = .7286 \pm .0000$
MINOR $\phi = .7105$ REF

-A-



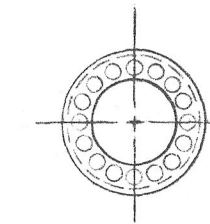
16 x $\phi .062$
16 EQUAL SPACES (@22.5°) ON
AN $\phi .580$ B.C.

// .001 -B-

⊥ .001 -A-
-B-

⊙ .005 -A-

$\phi .450$



ACTUAL SIZE

$\pm .003$
.125

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET DWG IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQT 9.
3. MATERIAL: CRES TYPE 455 PER AMS 5617.
4. FINISH: CLEAR PASSIVATE PER QQ-P-35, PRIOR TO HEAT TREATMENT.
5. HEAT TREATMENT: HARDEN TO COND. H1000, RH C45-C48.
6. MACHINE FINISH $100\checkmark$ ALL OVER.
7. CLEAN BEARING RETAINER PER 5-284-0.
8. VACUUM BAKE AND HANDLE PER 5-296-0.
9. BAG & TAG. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT IN PROT. PKG, SHALL BE PRFMD IN CLASS 100 ENVIR PER FED-STD-209.

200-89	16187
NEXT ASSY	USED ON
APPLICATION	

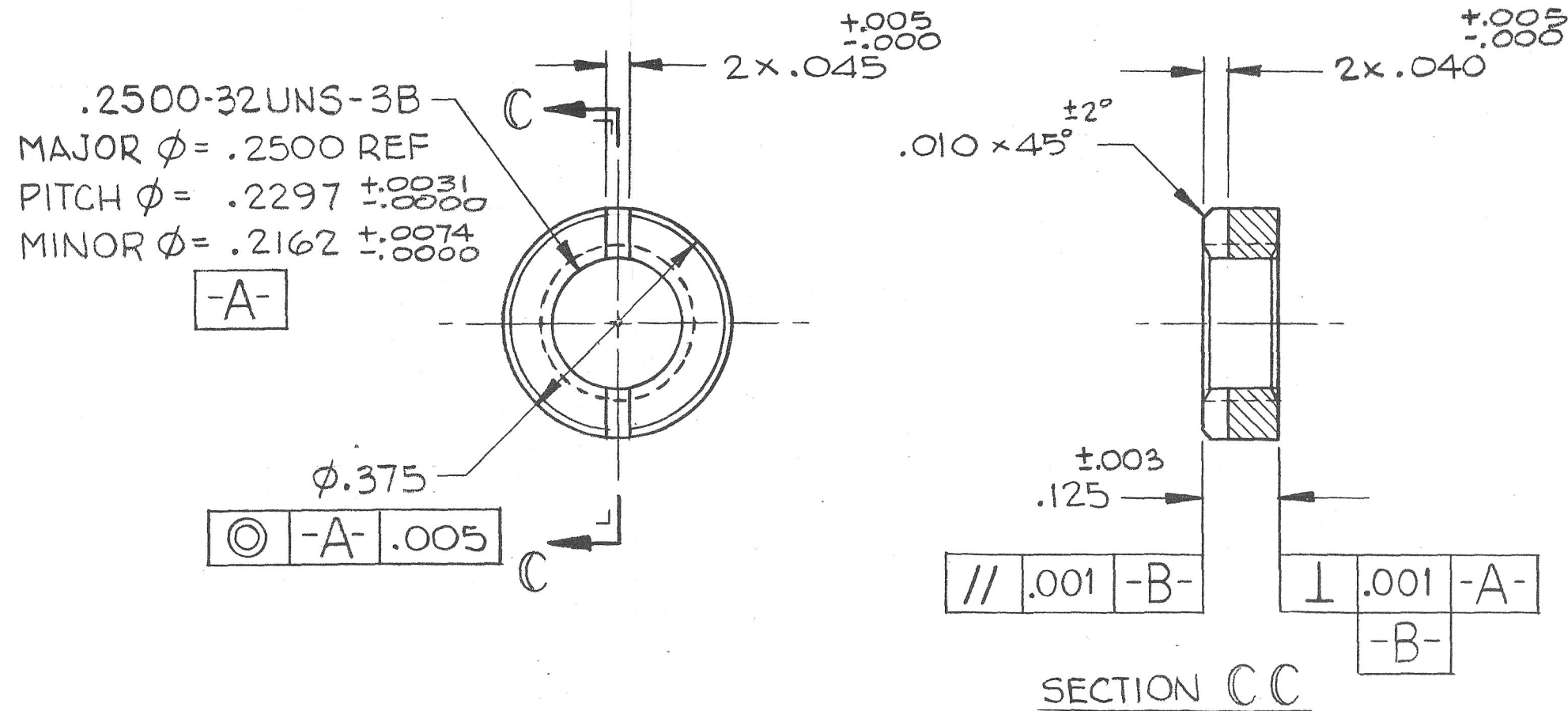
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^\circ 30'$	
BREAK SHARP CORNERS .005 MAX R	
ALL \checkmark SURFACES TO BE \checkmark	
MATERIAL	NOTE 3
FINISH	NOTES 4 & 5
DO NOT SCALE DRAWING	

CONTR NO. NAS8-39409	
BY OR/ APPROVED	DATE
DWN <i>file Samilli</i>	10-9-93
CHK <i>file Samilli</i>	
DESIGN <i>file Samilli</i>	5/16/94
ENGRG <i>file Samilli</i>	3/16/94
ENGRG	
PROJ	
QA <i>file Samilli</i>	3/12/94
MFG <i>file Samilli</i>	3/16/94

AEROFLEX AN ARX COMPANY		LABORATORIES INCORPORATED	PLAINVIEW N.Y. 11803
BEARING RETAINER OUTER			
SIZE B	CAGE CODE 88379	DWG NO 607-448	REV B
SCALE 4/1		SHEET 1 OF 1	

PROPRIETARY
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	3-16-94	<i>[Signature]</i>

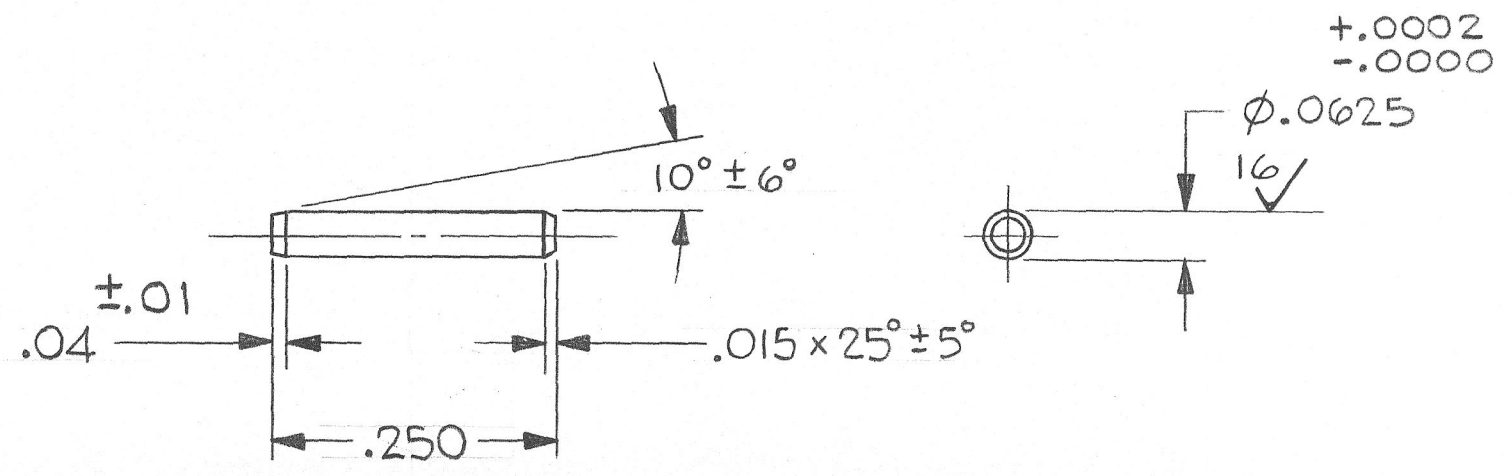


- NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET DWG IAW MIL-STD-100E AND ANSI Y14.5M 1982.
 2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQT 9.
 3. MATERIAL: CRES TYPE 455 PER AMS 5617.
 4. FINISH: CLEAR PASSIVATE PER QQ-P-35 PRIOR TO HEAT TREATMENT
 5. HEAT TREATMENT: HARDEN TO COND. H1000, RH C45-C48.
 6. MACHINE FINISH $100\sqrt{\text{ }}$ ALL OVER.
 7. CLEAN BEARING RETAINER PER 5-284-0.
 8. VACUUM BAKE AND HANDLE PER 5-296-0.
 9. BAG & TAG. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT IN PROTECTIVE PACKAGING, SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT PER FED-STD-209.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL $\pm .015$ 3 PLACE DECIMAL $\pm .005$ ANGULAR $\pm 0^\circ 30'$		CONTR NO NAS 8-39409		AEROFLEX LABORATORIES PLAINVIEW AN ARX COMPANY INCORPORATED N.Y. 11803	
BREAK SHARP CORNERS .005 MAX R		BY OR APPROVED	DATE	BEARING RETAINER INNER	
ALL $\sqrt{\text{ }}$ SURFACES TO BE $\sqrt{\text{ }}$		DWN <i>[Signature]</i>	93-9-13		
MATERIAL NOTE 3		CHK <i>[Signature]</i>	5/3/94	SIZE CAGE CODE DWG NO REV B 88379 607-449 B	
FINISH NOTES 4 & 5		ENGR <i>[Signature]</i>	5-16-94		
200-89 16187		ENG		SCALE: 1/1/1 SHEET 1 OF 1	
NEXT ASSY USED ON		PROJ			
APPLICATION		QA <i>[Signature]</i>	3/2/94		
DO NOT SCALE DRAWING		MEG <i>[Signature]</i>	3/1/94		

PROPRIETARY
EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF AEROFLEX LABORATORIES INC. AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE AEROFLEX EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED-TO-KNOW WHO BY THE USE HEREOF ACKNOWLEDGE AEROFLEX OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE	4-20-94	<i>[Signature]</i>

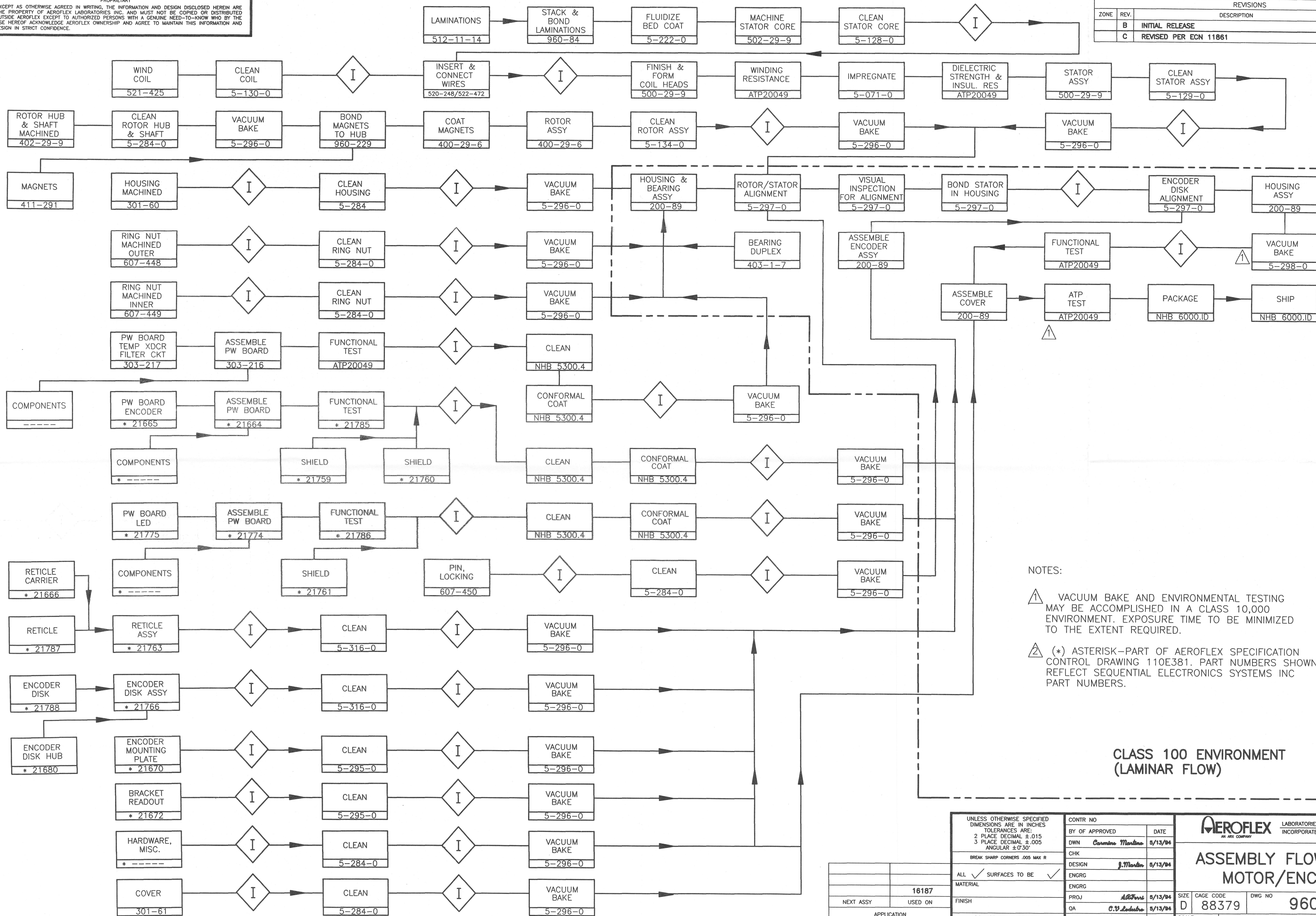


- NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET DWG IAW MIL-STD-100E AND ANSI Y14.5M 1982.
 2. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQMT 9.
 3. MATERIAL: CRES TYPE 435 PER AMS 5617.
 4. FINISH: CLEAR PASSIVATE PER QQ-P-35, PRIOR TO HEAT TREATMENT.
 5. HEAT TREATMENT: HARDEN TO COND. H1000, RH C45-C48.
 7. CLEAN PIN PER 5-284-0.
 8. VACUUM BAKE AND HANDLE PER 5-296-0.
 9. BAG & TAG. ALL OPERATIONS AFTER VACUUM BAKE, WHEN PARTS ARE NOT IN PROTECTIVE PACKAGING, SHALL BE PERFORMED IN A CLASS 100 ENVIRONMENT PER FED-STD-209.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ± .015 3 PLACE DECIMAL ± .005 ANGULAR ± 0° 30'		CONTR NO. NAS 8-39409		AEROFLEX AN ARX COMPANY LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803	
		BY OR APPROVED	DATE		
BREAK SHARP CORNERS .005 MAX R		DWN <i>[Signature]</i>	4-20-94	PIN, LOCKING	
ALL ✓ SURFACES TO BE 16 ✓		CHK <i>[Signature]</i>	5/1/94		
MATERIAL NOTE 3		DESIGN <i>[Signature]</i>	4-20-94	SIZE B CAGE CODE 88379 DWG NO 607-450 REV B	
FINISH NOTE 4 & 5		ENGRG <i>[Signature]</i>	4-20-94		
APPLICATION		PROJ <i>[Signature]</i>	4-20-94	SCALE NONE SHEET 1 OF 1	
DO NOT SCALE DRAWING		QA <i>[Signature]</i>	4-20-94		
		MFG <i>[Signature]</i>	4-20-94		

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
B	INITIAL RELEASE		5/13/94	ACB
C	REVISED PER ECN 11861		9-14-94	



NOTES:

1 VACUUM BAKE AND ENVIRONMENTAL TESTING MAY BE ACCOMPLISHED IN A CLASS 10,000 ENVIRONMENT. EXPOSURE TIME TO BE MINIMIZED TO THE EXTENT REQUIRED.

2 (*) ASTERISK-PART OF AEROFLEX SPECIFICATION CONTROL DRAWING 110E381. PART NUMBERS SHOWN REFLECT SEQUENTIAL ELECTRONICS SYSTEMS INC PART NUMBERS.

CLASS 100 ENVIRONMENT
(LAMINAR FLOW)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMAL ±.015 3 PLACE DECIMAL ±.005 ANGULAR ±0.30° BREAK SHARP CORNERS .005 MAX R		CONTR NO	
ALL SURFACES TO BE		BY OF APPROVED	
MATERIAL		DWN Carmine Martino 5/13/94	
FINISH		CHK	
DO NOT SCALE DRAWING		DESIGN J. Martin 5/13/94	
		ENGRG	
		ENGRG	
		PROJ A.R. 5/13/94	
		QA C.V. Ledesma 5/13/94	
		MFG H. 5/13/94	

16187		DATE	
NEXT ASSY USED ON		5/13/94	
APPLICATION		SIZE	
		CAGE CODE	
		DWG NO	
		REV	

AEROFLEX AN AIRCRAFT COMPANY		LABORATORIES INCORPORATED		PLAINVIEW N.Y. 11803	
ASSEMBLY FLOW CHART MOTOR/ENCODER					
SCALE NONE		88379		960-295	
				C	

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
200-89	16187	A	INITIAL RELEASE	6-6-94	<i>[Signature]</i>
		B	REVISED AS FOLLOWS: ADDED FIG. 9 (SH 25); SH 26 WAS SH 25; ON SH 9, FIG. 9 WAS FIG. 6; REPLACED SHEETS 18, 19 & 21 WITH UPDATED TEST CRITERIA (FIG'S 2, 3 & 5); ON SH 9: $S_x=12.7g$ WAS $10g$; $S_y=14.7g$ WAS $10g$; $S_z=7.2g$ WAS $10g$; DWG NO. 110E381 WAS 110E371 ECN 11861	6-28-94	<i>[Signature]</i>

SPECIFICATION CONTROL DRAWING

IDENTIFICATION OF THE "SUGGESTED SOURCE(S)" OF SUPPLY" HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM(S).

CONTR NO. NASB-39409

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	REV.	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.	1/25/94																																	
	DRAWN	ME 1-25-94																																	
MATERIAL	CHECKED																																		
	ENGRG	<i>[Signature]</i>																																	
FINISH	DESIGN	<i>[Signature]</i>																																	
	QA	<i>[Signature]</i>																																	
MFG.	SIZE	A																																	
	CAGE CODE	88379																																	
		110E381																																	
		SCALE											WEIGHT											SHEET 1 OF 26											

AEROFLEX
AN ARX COMPANY

LABORATORIES | PLAINVIEW
INCORPORATED | N.Y. 11803

ENCODER, OPTICAL

1.0 SCOPE

1.1 General

This specification establishes the design, construction, performance, and testing requirements for an aerospace quality Optical Encoder unit.

1.2 Background

The Encoder units will be used for control of a filter wheel. The wheel will be directly coupled to a motor shaft and use the motor shaft for support.

2.0 APPLICABLE DOCUMENTS

2.1 General

The following documents of latest issue shall form part of these requirements to the extent specified herein.

MSFC-SPEC-250	Protective Finishes for Space Vehicles, Structures, and Associated Flight Equipment, General Specification
MSFC-SPEC-445	Requirements for Adhesive Bonding, Process and Inspection
MSFC-SPEC-507	Specification, Low Solids (Thin) Conformal Coating Materials, PC Boards, Electronic and Electrical
MSFC-SPEC-521	Electromagnetic Compatibility Requirements on Payload Equipment and Subsystems
MSFC-SPEC-522	Design Criteria for Controlling Stress Corrosion Cracking
MSFC-SPEC-1198	Screening Requirements for Nonstandard (EEE Parts)
MSFC-STD-246	Design and Operational Criteria of Environments Areas
MSFC-STD-486	Torque Limits-Threaded Fastener Standard

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	2

2.1 General (Continued)

MSFC-STD-506	Standard Materials and Processes Control
MSFC-STD-1249	Standard, NDE Guidelines and Requirements for Fractural Control Programs
MSFC-PROC-508	Low Solids (Thin) Conformal Coating, Application of
MSFC-PROC-1301	Guidelines for the Implementation of Required Materials Control Procedures
MSFC-HDBK-505	Structural Strength Program Requirements
MSFC-HDBK-527	Material Selection Guide for Space Hardware Systems
MSFC-HDBK-1453	Fracture Control Program Requirements
NASA-TM-86538	Design and Verification Guidelines for Vibroacoustics and Transient Analysis
NHB 5300.4 (3A-2)	Requirements for Soldered Electrical Connections
NHB 5300.4 (3K)	Design Requirements for Rigid Printed Wiring Boards and Assemblies
NHB 8060.1	Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion
SP-R-0022	Vacuum Stability Requirements of Polymeric Materials for Spacecraft Applications
MIL-B-5087	Bonding, Electrical and Lighting Protection for Aerospace Systems
MIL-I-6870	Inspection Program Requirement, Nondestructive, for Aircraft and Missile Materials and Parts
MIL-STD-454	Electronic Equipment, General Requirements for

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SCALE	REV. B	SHEET	3

2.1 General (Continued)

MIL-STD-975 **Standard Parts List for Flight- and Mission-
Essential Ground Support Equipment, Military
Standard**

MIL-HDBK-5 Metallic Materials and Elements for Aerospace Vehicle Structures

MIL-HDBK-17, Part 2 Plastic for Aerospace Flight Vehicles

ANSI Y14.5M-1982 Dimensioning and Tolerancing

**ANSI Y32.2-1975 Graphic Symbols for Electrical and Electronics
Diagrams**

ANSI Y32.16-1975 Reference Designations for Electrical and Electronics Parts and Equipment

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SCALE	REV. B	SHEET	4

3.0 REQUIREMENTS

The Encoder shall be designed to be packaged into a motor housing and operate with a Brushless Permanent Magnet Stepper Motor.

3.1 Interface Definitions

The Encoder shall interface mechanically and electrically as specified in paragraph 3.2.2.

3.2 Characteristics

All characteristics in Section 3 of this specification, shall be verified by analysis, inspection, demonstration, similarity, verification of records, or test as specified in the SOW.

3.2.1 Performance

This paragraph and subparagraphs specify the functional characteristics of the unit with upper and lower limits for each performance parameter. These characteristics are expressed as values that must be achieved and maintained throughout the total life and environments described in Section 3.2.4, except where specifically stated otherwise.

3.2.1.1 Operating Duty

The unit shall operate for 400 hours duty in air and/or vacuum environments, per paragraph 3.2.1.1.1 and four (4) million cycles in vacuum environment per paragraph 3.2.1.1.2 and ten cycles at stall in vacuum environment, as described in the following subparagraph.

3.2.1.1.1 Continuous Duty

The unit shall be capable of 400 hours continuous operation. During such operation motor case temperature shall not exceed acceptance temperature limits (paragraph 3.2.4.3.1). The environment may be vacuum or ambient air. Continuous operation may consist of several periods of operation to total 400 hours.

3.2.1.1.2 Intermittent Duty

The unit shall operate as an intermittent duty unit with the duty cycle of two (2) revolutions in 20 seconds, off for 20 seconds repeated every 40 seconds for a total of four (4) million cycles. The environment shall be vacuum and temperatures specified in paragraph 3.2.4.3.4.

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	5

3.2.1.2 Encoder Power

The encoder will be powered with $+5 \text{ Vdc} \pm 200 \text{ millivolts}$. The encoder shall not dissipate more than 500 milliwatts at 0°C during operation.

3.2.2 Physical Characteristics

3.2.2.1 Size and Configuration

The size and configuration shall be in accordance with Figure 6.

3.2.2.2 Weight

The encoder shall be designed to a minimum weight and shall not exceed 15 ounces when combined with the motor and housing.

3.2.2.3 Mounting

The mounting dimensions shall be in accordance with the requirements in Figure 6. The unit shall operate as specified herein when mounted in any possible orientation. Dimensioning and tolerancing will be per ANSI Y14.5M-1982.

3.2.2.4 Thermal Design

The Encoder shall be designed to operate when exposed to temperatures of -40°C to 60°C . The selected temperature derating criteria of parts and materials in the unit shall provide a margin consistent with the life requirement in paragraph 3.2.4.

3.2.2.5 Sensor Operation

The sensor shall be an optical encoder with natural binary encoding. One of twelve addresses will be indicated at each 30° interval starting at the "one" position. These position indications will be at the center of the step with plus and minus half the motor's step angle of bandwidth. The encoder shall have open-collector outputs internally pulled up to $+5 \text{ Vdc}$ through 5K ohm resistors. The output "high" voltage shall not be less than 3.5 Vdc with 4.8 Vdc at the source.

3.2.2.6 Electrical Interface

Electrical interface shall be lead wire, 26 awg with a minimum length of 18 inches.

SIZE	CAGE CODE	110E381	
A	88379		
SCALE	REV.	B	SHEET 6

3.2.3 Reliability

For maximum reliability of the unit consideration shall be given to design with adequate margins, careful selection (and derating per MIL-STD-975) of parts and materials, good workmanship, cleanliness and quality control in the manufacturing process.

3.2.4 Life and Environments

3.2.4.1 Testing

All environmental tests shall be performed while assembled in the motor housing.

3.2.4.2 Useful Life

The useful life shall be in the sum of the storage life (paragraph 3.2.4.2.1) and the operating life (paragraph 3.2.4.2.2) without servicing or parts replacement. The useful life specified herein shall start upon delivery of the unit.

3.2.4.2.1 Storage Life

Three years after exposure to environmental levels which do not exceed those of paragraph 3.2.4.3.1, and number of hours of operation which do not exceed those of paragraph 3.2.1.1.1, the unit shall meet the requirements of this specification.

3.2.4.2.2 Operating Life

The unit shall meet the operating requirements of this specification during and after exposure to the environments specified herein.

3.2.4.3 Environments

The units shall meet the requirements of this specification during and/or after exposure to the environments as specified herein.

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	7

3.2.4.3.1 Transportation, Storage, and Handling (Non operating)

After exposure to any combination of the following environments, the unit shall operate and meet the requirements of this specification. Packaging and handling procedures and constraints shall be employed for protection if the below described environments are more severe than the environments of paragraphs 3.2.4.3.2, 3.2.4.3.3, and 3.2.4.3.4 or the test conditions imposed by Section 4.0.

Ambient Air Temperature - Controlled: -40°C to $+50^{\circ}\text{C}$.

Ambient Pressure - Controlled: 450 torr to 760 torr.

Humidity - Controlled: 0 to 70 percent relative humidity, no condensation permitted.

Static Acceleration: Maximum quasi-steady state accelerations of 3g in each of the three (3) axes simultaneously.

3.2.4.3.2 Functional Test, Checkout and Prelaunch Operations

The unit shall operate and meet the requirements of this specification during and after exposure to any combination of the following environments.

Ambient Air Temperature: -40°C of 60°C

Ambient Pressure: 450 torr to 800 torr

Humidity: 0 to 70 percent relative humidity, no condensation permitted.

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SCALE	REV. B	SHEET	8

3.2.4.3.3 Launch and Ascent Operations

After exposure to any combination of the following environments, while unpowered, the unit shall operate and meet the requirements of this specification.

Temperature: 0°C to 49°C at 450 to 800 torr
 0°C to 40°C at 450 to 1×10^{-7} torr

Ambient Pressure: Ambient pressure decreasing from a maximum of 800 torr to 1×10^{-7} torr at a maximum barometric rate of 14mm of mercury (Hg) per second.

Survival Mode (Non-operational):

a) Static Load: $S_x=12.7g$, $S_y=14.7g$, $S_z=7.2g$.

Axes are relative to the coordinate system in Figure 9.

$$R_{x,y,z} = 3 * (\pi/2 * Q * f_n * \text{PSD}_n)^{1/2}$$

where

Q = dynamic amplification factor at f_n (dimensionless)

f_n = component fundamental frequency (Hz)

PSD_n = input power spectral density value at f_n

TABLE 1 LOAD LIMITS		
Axis	Quasi-Static Load (Limit)	Random Load (Limit)
X	$\pm S_x$	$\pm R_x$
Y	$\pm S_y$	$\pm R_y$
Z	$\pm S_z$	$\pm R_z$

Reference section IV of NASA-TM-86538


SIZE A	CAGE CODE 88379	110E381	
SCALE 	REV. B	SHEET	9

TABLE 2
COMBINED LOADS WITH LOAD IN EACH AXIS
ACTING SIMULTANEOUSLY

Load Set	X Axis	Y Axis	Z Axis
1	$\pm(S_X + R_X)$	$\pm S_Y$	$\pm S_Z$
2	$\pm S_X$	$\pm(S_Y + R_Y)$	$\pm S_Z$
3	$\pm S_X$	$\pm S_Y$	$\pm(S_Z + R_Z)$

Where $R_{X,Y,Z}$ is the random component.

b) Sine Vibration: Sine input shown in Figure 2.

NOTE: Input Sine vibration levels may be notched, as required, to limit responses in 40-100 Hz range to 8.4g axial and 12.4g lateral.

c) Random Vibration input shown in Figure 3.

d) Acoustic Noise: As shown in Figure 4.

e) Shock Response: As shown in Figure 5.

3.2.4.3.4 Orbital Operation

The unit shall operate and meet the requirements of this specification during exposure to any combination of the following requirements

Temperature: -40°C to +30°C Operating
-40°C to +40°C Non-operating

Pressure: Hard vacuum with pressure of less than 1×10^{-7} torr.

Radiation as shown in 3.3.3.

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SCALE		REV. B	SHEET 10

3.2.5 Product Cleanliness

3.2.5.1 Surfaces

Surfaces of hardware shall be free of all visible contamination such as fingerprints, particles, corrosion products, metal chips, scale, oil, grease, preservatives, adhesives, and any other foreign matter. Visual inspection shall be accomplished without magnification under good lighting conditions equivalent to a white oblique light of 100-125 foot candle intensity at a distance of 40 centimeters. Wipe tests, ultraviolet light inspection, special lights and mirrors, are considered aids to visual inspection.

3.2.5.2 Clean Area

Design and operational criteria of controlled environment areas shall be in conformance with MSFC-STD-246 Class 100 clean room.

3.2.5.3 Cleaning

Cleaning procedures shall be established to insure the removal of any process consumables used in the manufacture of the hardware. Metallic surfaces shall be cleaned prior to the application of any protective finish. Materials used for cleaning shall be submitted per paragraph 3.3.1

3.3 Design and Construction

3.3.1 Materials and Processes

All materials and processes shall meet the requirements of the following:

MSFC-STD-506 The Materials and Processes Selection and Control Standards

MSFC-PROC-1301 Guidelines for the Implementation of Required Materials Control Procedures

MSFC-SPEC-522 Design Criteria for Controlling Stress Corrosion Cracking

Metals shall be selected from Table 1 or approved by a Material Usage Agreement, (MUA) evaluation.

SP-R-0022 General Specification for Vacuum Stability Requirements of Polymeric Material for Spacecraft Application

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	11

ARESCO, HICKSVILLE, N. Y. - OGILVIE 075900

3.3.1 Materials and Processes (Continued)

Material shall be A-rated for thermal vacuum stability per MSFC-HDBK-527 or approved by MUA evaluation.

MSFC-SPEC-250 General Specification for Protective Finishes for Space Vehicle Structures and Associated Flight Equipment

For information MSFC-HDBK-527 contains the tabulated test data that shall be used as a basis for material selections. A comprehensive data set containing the most recent test data is found on the Materials and Processes Technical Information System (MAPTIS).

3.3.1.1 Materials Requirements

Overall material selections shall be compatible with performance and environmental criteria as specified herein. The vendor shall request use of material which;

- 1) Does not meet specified requirements
- 2) Is not "A" rated per MSFC-HDBK-527

with a MUA containing supporting rational for use of the material for the specific application. MUA's are evaluated and dispositioned by the Materials and Processes Laboratory, MSFC.

Selection of parts shall be made from existing qualified parts lists, where possible. Commercial parts shall be selected with consideration of;

System Design
Functional Requirements
Reliability Requirements

Allowable mechanical properties of structural materials shall be obtained from authoritative sources such as;

MIL-HDBK-5
MIL-HDBK-17, Part 2

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	12

3.3.1.2 Processing Requirements

3.3.1.2.1 Bonding

Electrical bonding shall be in accordance with MIL-B-5087, Class R. Structural bonding shall be in accordance with MSFC-SPEC-445.

3.3.1.2.2 Soldering

Soldering electrical connectors shall meet the requirements of NHB 5300.4 (3A-2).

3.3.1.2.3 Non-Destructive Inspection (NDI)

NDI shall be performed to ensure that parts will not fail during the required useful life of the unit. All NDI performed shall meet the requirements of MIL-I-6870 except that a NDI plan is not required.

3.3.1.2.4 Fractural Control

Fractural control shall be implemented in accordance with all sections of MSFC-HDBK-1453. All sections of MSFC-STD-1249 shall provide guidelines for the selections and applications of Non-Destructive Evaluation (NDE) Techniques required to implement a fracture control program.

3.3.1.2.5 Conformal coating of Printed Circuit Boards

Conformal coatings shall be applied to printed circuit boards per the requirements of MSFC-PROC-508. Conformal coatings materials shall be in accordance with MSFC-SPEC-507. Coating other than those specified in MSFC-SPEC-507 may be used if flammability and offgassing requirements are met with specific NASA approval prior to usage.

3.3.1.3 Parts Selection and Control

SIZE A	CAGE CODE 88379	110E381	
SCALE		REV. B	SHEET 13

3.3.1.3.1 Electrical, Electronic, Electomechanical (EEE) Parts

The vendor shall make maximum practical use of Grade 2 NASA Standard parts (EEE) from MIL-STD-975. The quality level of all nonstandard parts shall be equivalent to applicable types of Grade 2 Standard Parts. EEE parts selected for use from sources other than MIL-STD-975 are considered Non-Standard Parts. For non-standard parts, the minimum screening requirements shall be as specified in MSFC-SPEC-1198. In addition, first consideration shall be given to the inherent capability of the parts to withstand the space, terrestrial, and mission environments to which the parts will be subjected.

3.3.1.3.2 Printed Wiring Board

Printed wiring boards used shall be in accordance with NHB 5300.4 (3K).

3.3.1.3.3 Mechanical Parts

Standard mechanical parts shall be used to maximum practical extent. Nonstandard parts shall be covered by specification or source control drawings.

3.3.1.3.4 Fasteners

Fasteners allowable strength shall be in accordance with MIL-HDBK-5E. Installation torque values for threaded fasteners shall be per MSFC-STD-486A as applicable.

3.3.1.3.5 Design Factors of Safety

the factors of safety shall be in accordance with all sections of MSFC-HDBK-505A. For metallic hardware verified by analysis only with no static structural test, MSFC-HDBK-505A specifies factors of safety of 1.25 on yield and 2.0 on ultimate.

3.3.1.4 Traceability

Each lot/batch of material procured for use or used in fabrication shall be traceable by the manufacturer's lot/batch number or a lot/batch number assigned at receiving inspection to the point where it loses its identity as a raw material and from that point back to the assigned lot/batch number. The lot/batch number shall be recorded in the Manufacturing Process Plan/Procedure using the material, which provides traceability back to the raw material used.

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	4

3.3.2 Electromagnetic Radiation

The unit shall be defined to minimize the generation of interference which could be detrimental to other subsystems on the spacecraft. The unit shall be in accordance with the electromagnetic compatibility requirements of MSFC-SPEC-521.

3.3.3 Radiation

The unit will be exposed to the geosynchronous radiation environment with no significant external shielding provided. The total dose and particle fluence used for design are shown in Figure 1. Figure 1A and Figure 1B shall be interpreted as the mission total dose design requirement, including applicable uncertainty factors and margins. Spot shielding of dip packages and optical components shall be employed.

3.3.4 Identification

Identification and marking of the unit, its components and parts, shall be in accordance with MIL-STD-129.

3.3.4.1 Electrical and Electronic Symbols

If schematic information is affixed to the unit, the electrical and electronic symbols shall be in accordance with the requirements of ANSI Y32.2-1975.

3.3.5 Workmanship

All parts and assemblies shall be designed, constructed, and finished, in a quality manner intended to produce defect-free equipment. This will be done in accordance with MIL-STD-454, Requirement 9.

4.0 VERIFICATION

The vendor shall verify that all deliverable hardware items are in compliance with the specification requirements and in condition to perform all intended functions when delivered.

4.1 Responsibility for Tests

The vendor shall perform all testing requirements of this specification.

4.2 Quality Conformance Examination

4.2.3 Test Type

SIZE A	CAGE CODE 88379	110E381	
SCALE		REV. B	SHEET 15

FIGURE 1 (A)

TOTAL DOSE AT CENTER OF ALUMINUM SPHERES FOR SXI MISSION

Shield Thickness (millimeters aluminum)	Electrons	Bremsstrahlung	Protons	Total Dose
0.04	2.775E 08	1.127E 05	2.189E 04	2.776E 08
0.07	1.926E 08	9.505E 04	2.211E 04	1.927E 08
0.11	1.459E 08	8.236E 04	2.231E 04	1.460E 08
0.15	1.160E 08	7.333E 04	2.253E 04	1.161E 08
0.19	9.494E 07	6.641E 04	2.277E 04	9.503E 07
0.22	7.939E 07	6.065E 04	2.303E 04	7.947E 07
0.26	6.746E 07	5.568E 04	2.330E 04	6.754E 07
0.30	5.806E 07	5.135E 04	2.361E 04	5.813E 07
0.33	5.052E 07	4.756E 04	2.390E 04	5.059E 07
0.37	4.426E 07	4.421E 04	2.444E 04	4.433E 07
0.74	1.661E 07	2.597E 04	2.851E 04	1.666E 07
1.11	7.988E 06	1.834E 04	2.510E 04	8.031E 06
1.48	4.139E 06	1.392E 04	2.166E 04	4.174E 06
1.85	2.239E 06	1.104E 04	1.937E 04	2.270E 06
2.22	1.245E 06	9.087E 03	1.737E 04	1.272E 06
2.96	4.029E 05	6.808E 03	1.447E 04	4.242E 05
3.70	1.403E 05	5.590E 03	1.233E 04	1.582E 05
4.63	4.086E 04	4.686E 03	1.042E 04	5.596E 04
5.56	1.447E 04	4.088E 03	8.776E 03	2.733E 04
6.48	6.623E 03	3.652E 03	7.781E 03	1.806E 04
7.41	2.809E 03	3.317E 03	6.853E 03	1.298E 04
9.26	2.386E 02	2.841E 03	5.064E 03	8.143E 03
11.11	4.316E 00	2.516E 03	4.285E 03	6.806E 03
12.96	0.0	2.278E 03	3.430E 03	5.708E 03
14.81	0.0	2.092E 03	2.793E 03	4.885E 03
16.67	0.0	1.940E 03	2.421E 03	4.360E 03
18.52	0.0	1.811E 03	2.033E 03	3.843E 03
22.22	0.0	1.599E 03	1.486E 03	3.084E 03
29.63	0.0	1.305E 03	8.652E 02	2.170E 03
37.04	0.0	1.097E 03	5.221E 02	1.619E 03

Information Excerpted from GSFC-X-601-84-02, "The Space Radiation Environment For GOES Missions,"
by E.G. Stassinopoulos and J.M. Barth. January, 1984.

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	16

FIGURE 1 (B)

Table A. Electron Fluence

Energy (Mev)	Electrons $\text{cm}^{-2} \text{ 5 years}^{-1} >E$
0.1	3.4 E 15
0.5	4.9 E 14
1.0	1.0 E 14
1.5	2.3 E 14
2.0	5.4 E 12
2.5	1.4 E 12
3.0	3.8 E 11
3.5	2.0 E 11
4.0	1.1 E 11
4.5	1.8 E 10
5.0	2.9 E 10
5.5	4.9 E 09
6.0	0 E 09

Table B. Solar Flare Proton Fluence

Energy (Mev)	Protons $\text{cm}^{-2} \text{ 5 years}^{-1} >E$
0.04	2.3 E 15
0.1	9.4 E 14
0.5	1.4 E 13
1.0	1.5 E 11
10.0	5.0 E 10
30.0	2.4 E 10
60.0	7.6 E 09
100.0	1.7 E 09

Table C. Cosmic Ray Spectrum

Galactic Cosmic Rays: Representative Fluences

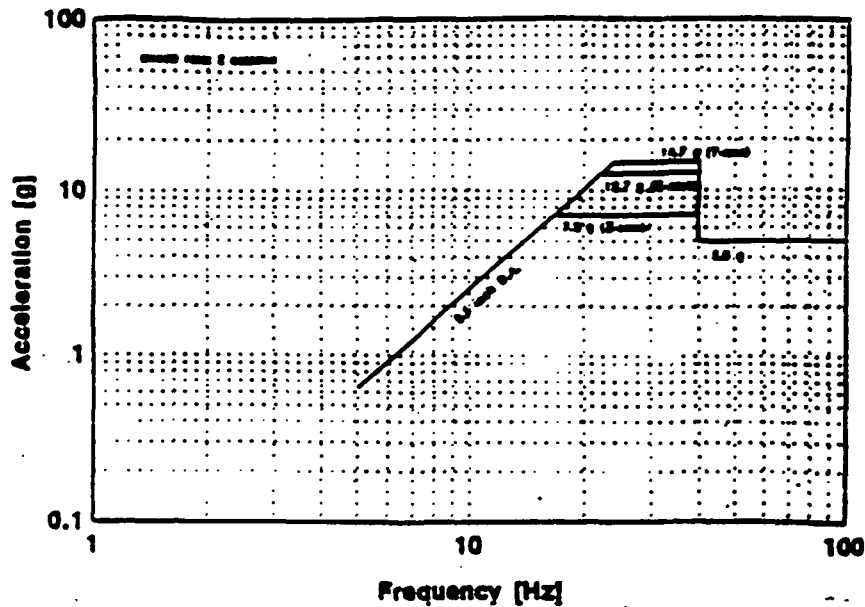
Charge (Element)	Particles $\text{cm}^{-2} \text{ sec}^{-1}$
1 (Hydrogen)	4.0
2 (Helium)	0.5
8 (Oxygen)	0.03
14 (Silicon)	0.007
26 (Iron)	0.003

Abundance by Charge Groups compared to He given above

3	z	5	1/48
6	z	9	1/16
10	z	14	1/75
15	z	19	1/600
20	z	30	1/200
30	z		1/800000

SIZE A	CAGE CODE 88379	110E381	
SCALE		REV. B	SHEET 17

**Figure 2. Qualification Sine Vibration Environment
Sine Vibration Input at SXI Telescope
(Qualification Level = 1.4 x Flight Level)**



SXI Telescope Qualification Sine Vibration Test Input Specification

Axis	Frequency [Hz]	Input Level*
X	5 - 22.3	0.5 inch D.A.
	22.3 - 40	12.7 g
	40 - 100	5.0 g
Y	5 - 24	0.5 inch D.A.
	24 - 40	14.7 g
	40 - 100	5.0 g
Z	5 - 16.8	0.5 inch D.A.
	16.8 - 40	7.2 g
	40 - 100	5.0 g

* Input levels may be notched at SXI test as required to limit responses (5 to 100 Hz) per following table.

SXI Telescope Qualification Sine Vibration Notching Criteria

Axis	At Aperture	At CG	At Aft End
X	12.7 g	12.7 g	12.7 g
Y	14.7 g	14.7 g	32.5 g
Z	7.2 g	7.2 g	15.5 g

SIZE A	CAGE CODE 88379	110E381	
SCALE		REV. B	SHEET 18

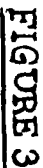
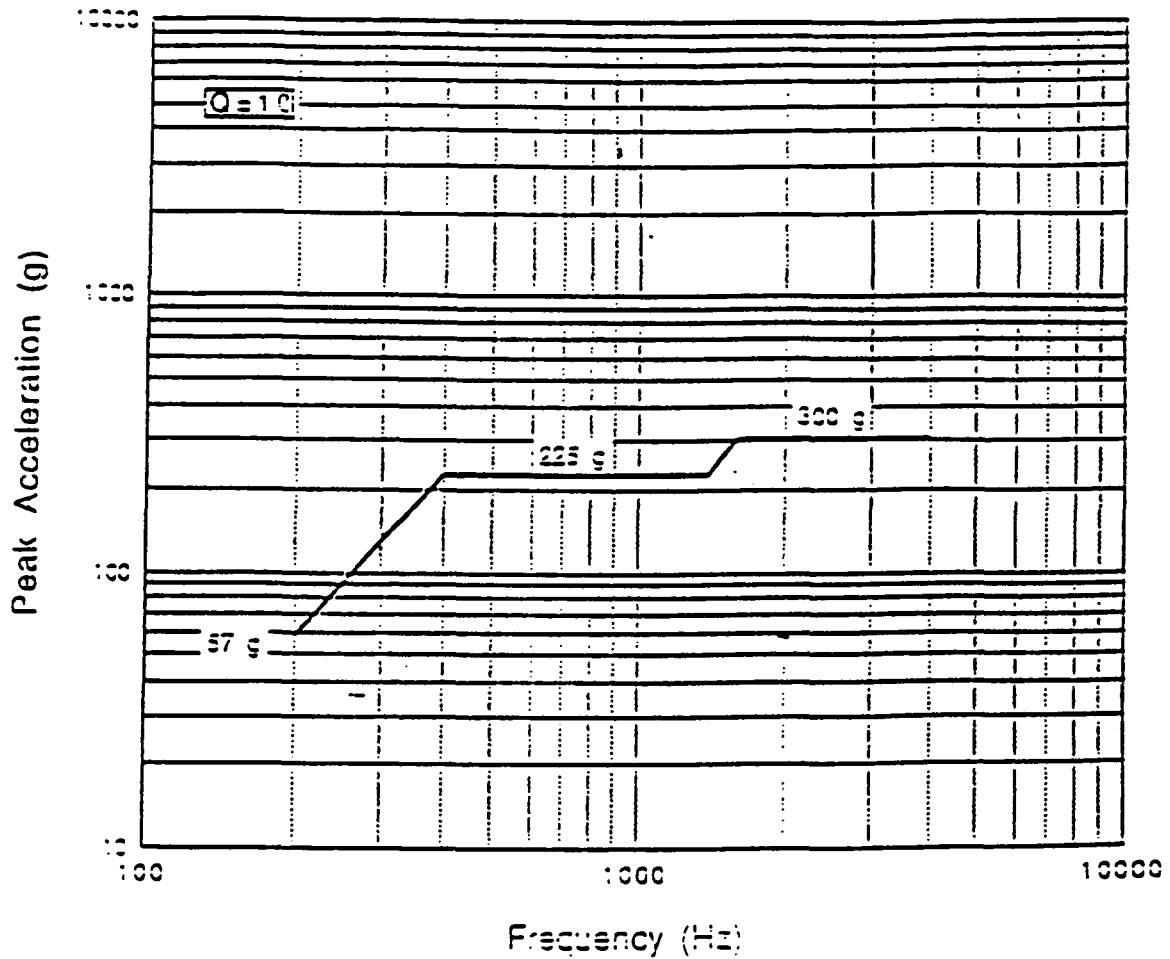


FIGURE 4

SHOCK TEST CRITERIA SPECTRUM

SHOCK RESPONSE SPECTRUM - SXI
(QUALIFICATION)

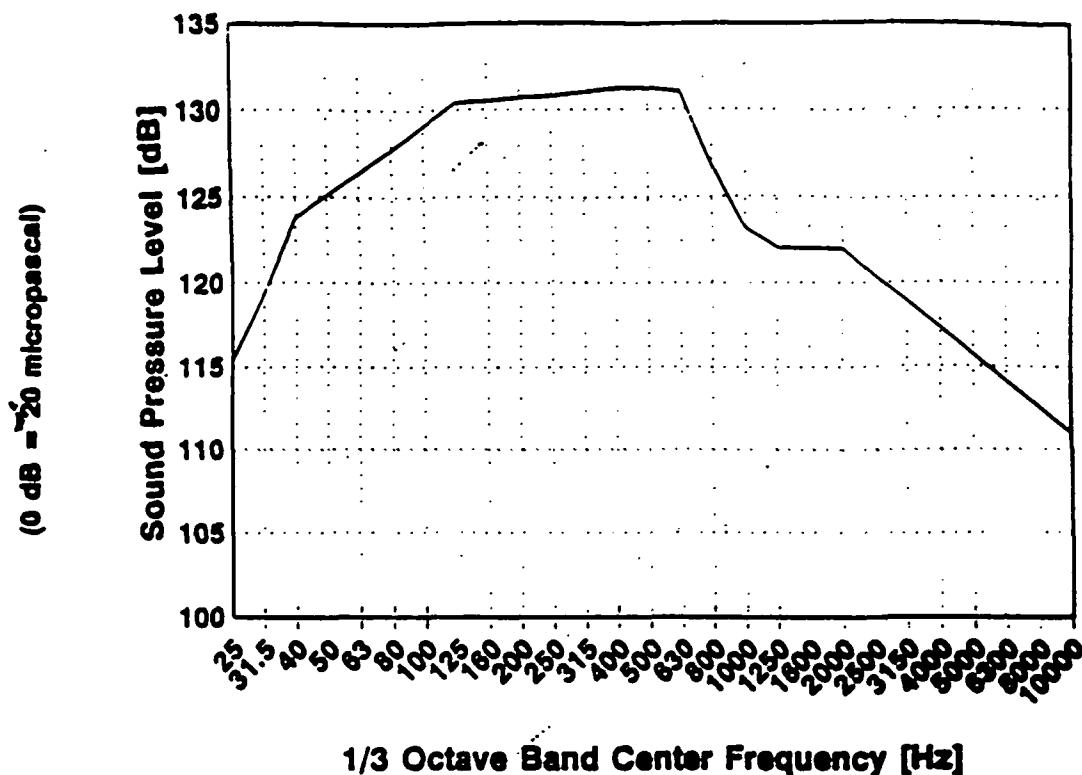


	Frequency (Hz)	Shock Response (g) (Q=10)
	All Axes	
	200	57
	400	225
	1400	225
	1600	300
	4000	300

TEST TOLERANCE = +3/-1.5 dB

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET	20

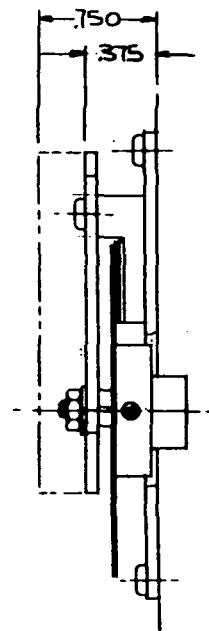
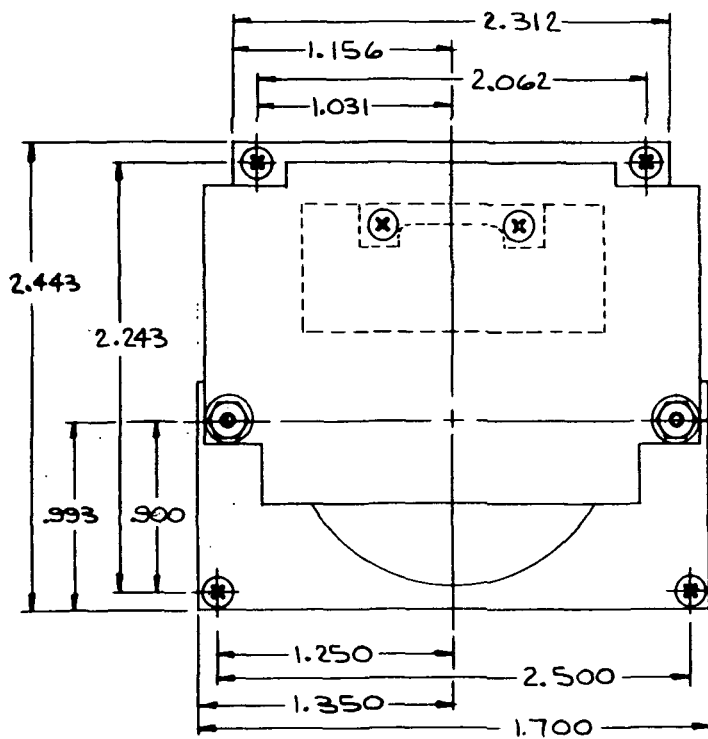
Figure 5 . Acoustic Environment



1/3 Octave Band Center Frequency (Hz)	Acoustic Sound Pressure Level (dB) (0 dB = 20 micropascal)		
	Assessment	Qualification	Tolerance
25	122.4	123.4	-6/-1
31.5	116.3	119.3	-6/-4
40	125.8	123.9	-6/-1
50	122.1	128.1	-6/-4
63	123.4	126.4	-6/-1
80	124.7	127.7	24
100	126.1	129.1	23
125	127.4	130.4	23
160	127.5	132.9	23
200	127.7	133.7	23
250	127.8	133.8	23
315	127.7	131.9	23
400	128.2	131.2	23
500	128.2	131.2	23
630	128.2	131.9	23
800	123.8	126.8	23
1000	123.2	123.2	23
1250	119.1	122.2	24
1600	119.6	122.0	24
2000	119.6	122.0	24
2500	117.4	123.4	24
3150	113.9	118.9	-6/-1
4000	114.3	117.3	-6/-1
5000	112.7	119.7	-6/-1
6300	111.1	114.1	-6/-1
8000	109.6	112.6	-6/-1
10000	108.0	111.0	-6/-1
Overall	128.3	141.3	25
Test Duration	80 seconds		-6/-4 :00

SIZE A	CAGE CODE 88379	110E381	
SCALE	REV. B	SHEET 21	

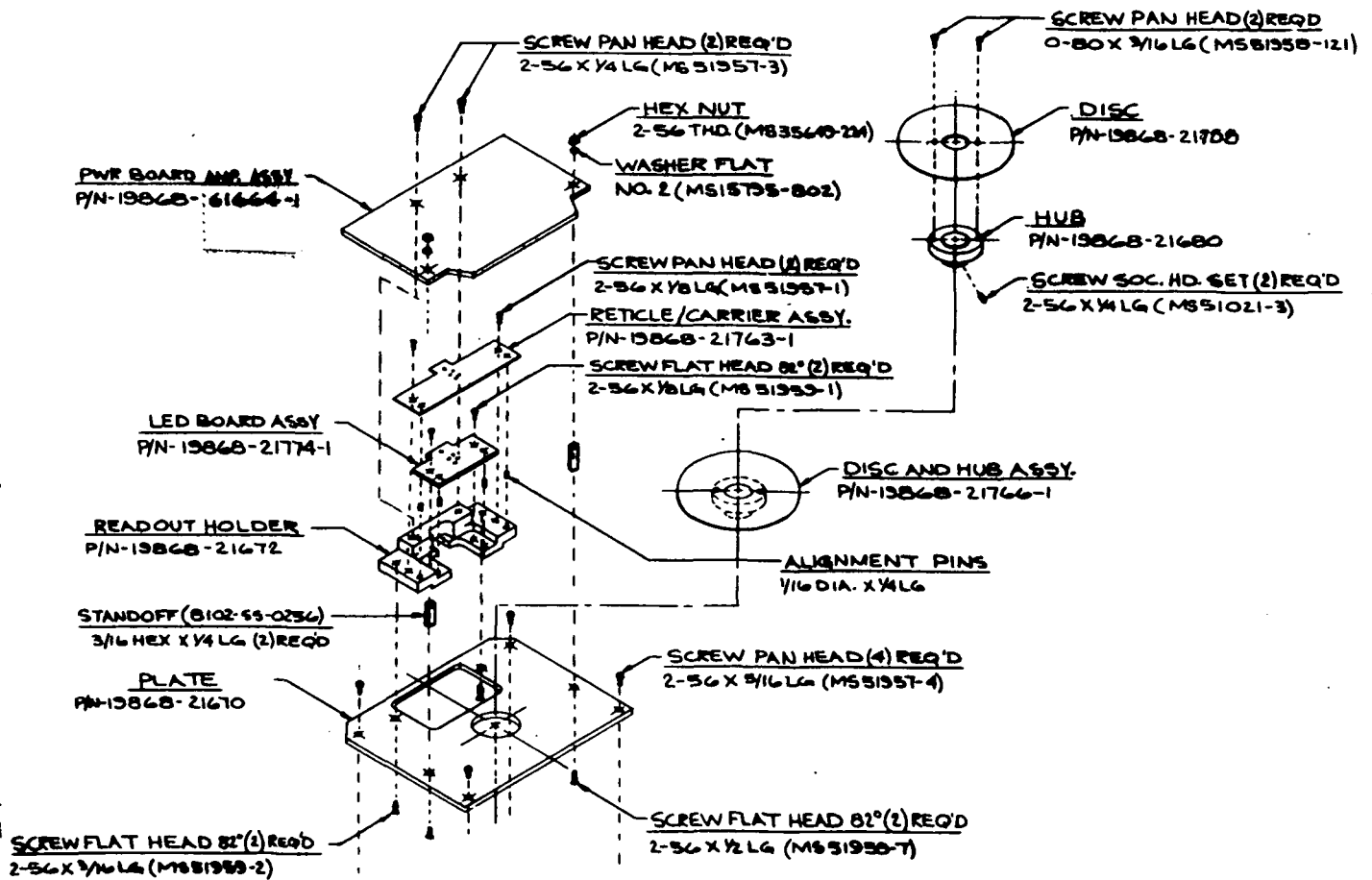
FIGURE 6
ENCODER OUTLINE



SIZE A	CAGE CODE 88379	110E361	
SCALE \rightarrow A	REV. B	SHEET 22	

FIGURE 7

ENCODER PARTS LIST



SIZE A	CAGE CODE 88379	110E381	
SCALE —	REV. B	SHEET 23	

ARX-12-85

FIGURE 8

ENCODER ELECTRONIC COMPONENTS

ITEM	SYMBOL	PART NO.	DESCRIPTION	QTY
1	CR1-CR5	565304-1	Phototransistor OP604	5
2	CR6-CR11	JANS1N4464	Zener Diode, Voltage Regulator, 9.1V	5
3	U1	M38510/11201BCA (or B)	Quad Comparator LM139J	1
4	U2	M38510/00801BCA	Hex Inverter SN5406J	1
5	C1	M39014/02-1350	Ceramic Capacitor CKR06 0.1uF $\pm 10\%$ 100V FRL=S	1
6	C2	M39003/02-2040	Tantalum Electrolytic Capacitor CSR09 6.8uF $\pm 10\%$ 20V FRL=B Case B1	1
7	R1-5	RCR05GXXXXX	Fixed Composition Resistor Select At Test	5
8	R6-R9	RCR05G103JR (or P)	Fixed Composition Resistor 10K $\pm 5\%$ 1/8W	4
9	R10-R13	RCR05C105JR (or P)	Fixed Composition Resistor 1M $\pm 5\%$ 1/8W	4
10	R14-R21	RCR05G512JR (or P)	Fixed Composition Resistor 5.1K $\pm 5\%$ 1/8W	8
11	R22-R25	RCR05G102JR (or P)	Fixed Composition Resistor 1K $\pm 5\%$ 1/8W	4
12	R26-R27	RCR05G201JR (or P)	Fixed Composition Resistor 200 Ω $\pm 5\%$ 1/8W	2
13	R28	RCR05G391JR (or P)	Fixed Composition Resistor 390 Ω $\pm 5\%$ 1/8W	1
14	DS1-DS5	565305-1	LED OP604	5

NOTE:

Item 1-13: Used on Encoder Printed Wire Board Assembly

Item 14: Used on LFD Printed Wiring Board Assembly

SCALE

A

SIZE

88379

CAGE CODE

REV.

B

SHEET

24

110E381

ARK-12-85

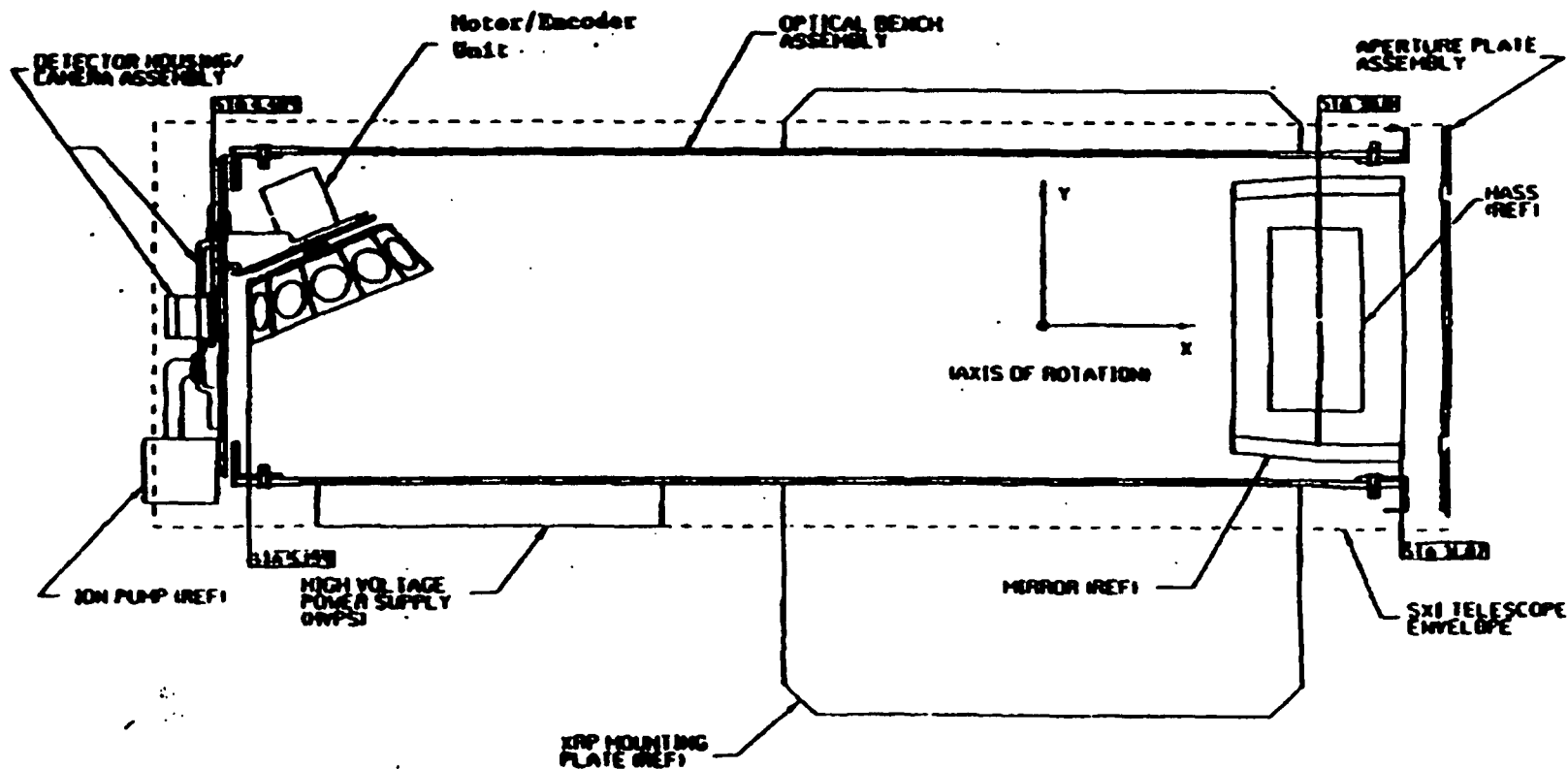


FIGURE 9

SOLAR X-RAY IMAGER (SXI) TELESCOPE LAYOUT

SIZE	88379	CASE CODE	110E381
SCALE	REV. B	SHEET	25

SUGGESTED SOURCE OF SUPPLY

AEROFLEX PART NUMBER	SUPPLIER DATA		
	CAGE CODE	PART NUMBER	NAME AND ADDRESS
110E381	16858	21770	SEQUENTIAL ELECT SYSTEMS, INC. 294 N. SAW MILL RIVER ROAD ELMSFORD, N.Y. 10523

SIZE A	CAGE CODE 88379	110E381
SCALE <i>1/2</i>	REV. B	SHEET 26

403-1-7

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
200-89	16187	A	INITIAL RELEASE	10-5-93	<i>RF</i>
		B	REVISED TO REFLECT INSPECTION NOTE & LUBRICATION MATERIAL	3-16-94	<i>RF</i>

INSPECT IN A CLASS 100 ENVIRONMENT
(LAMINAR FLOW)

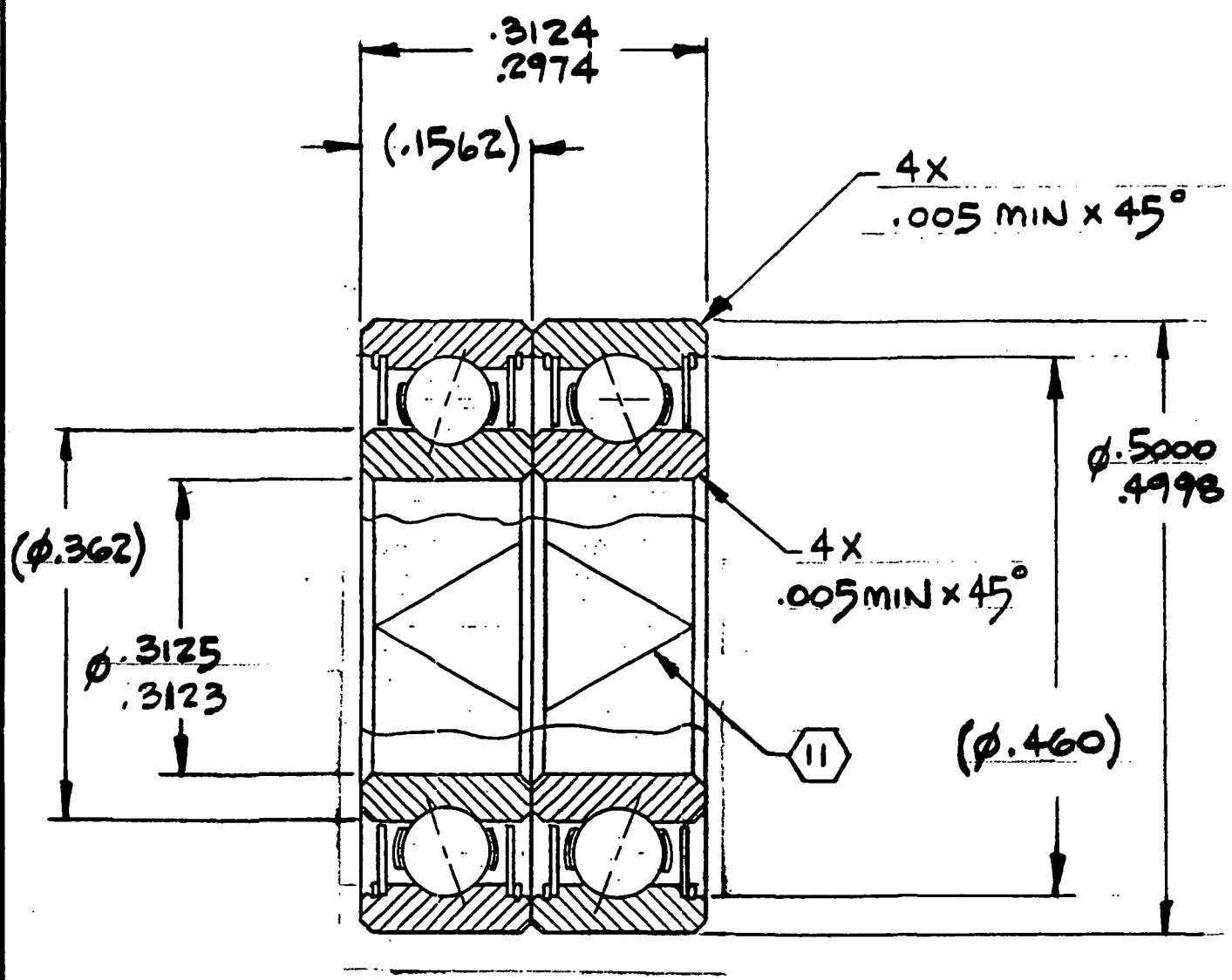
SPECIFICATION CONTROL DRAWING

IDENTIFICATION OF THE "SUGGESTED SOURCE(S) OF SUPPLY" HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM(S).

CONTR NO. NAS8-39409

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	REV.	8	8	8	8																														
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.		<div style="display: flex; justify-content: space-between;"> <div> AEROFLEX AN ARX COMPANY </div> <div> LABORATORIES PLAINVIEW INCORPORATED N.Y. 11803 </div> </div>																																
	DRAWN <i>RF</i> 10-5-93																																		
MATERIAL <i>4</i>	CHECKED		<div style="text-align: center; font-size: 1.2em;">BEARING, DUPLEX</div>																																
	ENGNRG <i>RF</i> 3-14-94																																		
FINISH <i>4</i>	DESIGN <i>RF</i> 3-14-94		<div style="display: flex; justify-content: space-between;"> <div> SIZE A CAGE CODE 88379 SCALE - WEIGHT - </div> <div> 403-1-7 </div> </div>																																
	QA <i>RF</i> 3-14-94																																		
MFG. <i>RF</i> 3-14-94		SHEET 1 OF 4																																	

403-1-7



ARESCO, HICKSVILLE, N. Y. - OGLVIE 075900

SIZE	CAGE CODE	403-1-7	
A	88379		
SCALE	-	REV. B	SHEET 2

Inspect in a Class 100 Environment
(Laminar Flow)

NOTES:

1. MATERIAL: RINGS & BALLS - AISI 440C CRES, Rc 58-62, code SS
SEALS - GLASS REINFORCED TEFLON (ARMALON),
CODE LL
SNAPRINGS - AISI 300 SERIES CRES
RIBBON RETAINER - AISI 300 SERIES CRES,
CODE R
2. TOLERANCE: ABEC 7, CODE A7
3. RADIAL PLAY: .0006- .0008, CODE P68
4. LUBRICATION: 25-30% fill with Braycote 601 Micronic
Grease, Bray Oil Co.
5. BALL COMPLEMENT: 11 - 1/16 DIA, EACH BEARING
6. RACE CURVATURE: 57 ± 1 PER CENT BOTH RINGS
7. LOAD RATINGS: STATIC "Co" 86 LBS
DYNAMIC "C" 154 LBS
THRUST "To" 76 LBS
8. RADIAL RUNOUT: .000050
9. BEARING STIFFNESS:
AXIAL YIELD .00002608 INCHES/POUND
RADIAL YIELD .00000478 INCHES/POUND
10. DUPLEX ASSEMBLY DB CONFIGURATION, BACK TO BACK WITH
10 LB PRELOAD, CODE DB10
11. ELECTRO-ETCH O.D. TO INDICATE PROPER DIRECTION FOR
ASSEMBLY
12. PACKAGING: UNIT PACK, CODE UB

SIZE A	CAGE CODE 88379	403-1-7	
SCALE		REV. B	SHEET 3

403-1-7 -

SUGGESTED SOURCE(S) OF SUPPLY

PART NUMBER	VENDOR		VENDOR PART NUMBER	ITEM IDENTIFICATION
	NAME/ADDRESS	CAGE CODE		
403-1-7	NHBB INC. 9727 DESOTO AVE CHATS WORTH, CA. 91311	50294	SSRI-8516 LLDB10RA7 P68LY328UB	BEARING, DUPLEX

SIZE
A

FSQM NO.
88379

REV. B

403-1-7

SHEET

4

ITEM IDENTIFICATION: APPLY THE FOLLOWING MARKING TO CONTAINER IN
ACCORDANCE WITH MIL-STD-130

ARX-12-85

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	ZONE	REV	DESCRIPTION	DATE	APPROVED
500-20-9	16187		A	INITIAL RELEASE	7-20-94	<i>[Signature]</i>

POLES	PHASE	SPAN	SLOTS COUNTED	TYPE WIND	NO. OF SLOTS
24	2	1-3	CCW	LAP	48

1. IDENTIFY AS SLOT NO.1 _____
2. COILS ARE WOUND IN _____ SETS. EACH SET SHALL CONSIST OF _____ GROUP OF _____ COILS EACH.

A GROUP IDENTIFIED WITH WHT THREAD.


B GROUP IDENTIFIED WITH RED THREAD.

_____ GROUP IDENTIFIED WITH _____ THREAD.

3. INSERT A COIL, START IN SLOT _____ FINISH OUT OF SLOT _____

W- 1 * L - 3	W- 13 L - 15	W- 25 L - 27	W- 37 L - 39
R- 2 * - 4	R- 14 L - 16	R- 26 L - 28	R- 38 L - 40
W- 5 - 3	W- 17 - 15	W- 29 - 27	W- 41 - 39
R- 6 - 4	R- 18 - 16	R- 30 - 28	R- 42 - 40
W- 5 - 7	W- 17 - 19	W- 29 - 31	W- 41 - 43
R- 6 - 8	R- 18 - 20	R- 30 - 32	R- 42 - 44
W- 9 - 7	W- 21 - 19	W- 33 - 31	W- 45 - 43
R- 10 - 8	R- 22 - 20	R- 34 - 32	R- 46 - 44
W- 9 - 11	W- 21 - 23	W- 33 - 35	W- 45 - 47
R- 10 - 12	R- 22 - 24	R- 34 - 36	R- 46 - 48
W- 13 - 11 L	W- 25 - 23 L	W- 37 - 35 L	W- 1 - 47 L
R- 14 - 12 L	R- 26 - 24 L	R- 38 - 36 L	R- 2 - 48 L

"*" INDICATES LEAVE COIL SIDE OUT, PITCH IN LATER.
 "L" INDICATES WHERE LEAD EMANATES.
 "J" INDICATES JUMPER BETWEEN COIL GROUPS.

CONTR NO. <u>NAS 8-39409</u>		 AEROFLEX <small>AN ARX COMPANY</small>		LABORATORIES		PLAINVIEW
BY OR APPROVED	DATE			INCORPORATED		N.Y. 11803
DWN <u>JZ</u>	<u>7-20-94</u>	<div style="text-align: center;"> <h2>INSERTION INSTRUCTIONS</h2> </div>				
CHK						
DES						
ENG						
ENG						
PRJ <i>[Signature]</i>	<u>7-20-94</u>	SIZE <u>A</u>	CAGE CODE <u>88379</u>	DWG NO. <u>520-248</u>	REV <u>A</u>	
QA <i>[Signature]</i>	<u>7-20-94</u>	SCALE		SHEET		
MFG <i>[Signature]</i>	<u>7/20/94</u>					

WT/GP	WIRE <i>M1177/14-01C034</i>	COLOR THREAD WHITE	T/C 88														
DESC. PHASE A	RES/GP <i>20.4Ω</i>	WIND (4) GP	STOP MACHINE ●	88	176	264	352	440	528								



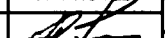



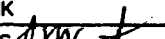
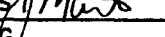
WT/GP	WIRE <i>M1177/14-01C034</i>	COLOR THREAD RED	T/C 88														
DESC. PHASE B	RES/GP <i>20.4Ω</i>	WIND (4) GP	STOP MACHINE ●	88	176	264	352	440	528								

WT/GP	WIRE	COLOR THREAD	T/C														
DESC.	RES/GP	WIND () GP	STOP MACHINE ●														

WINDING TYPE: 2 PHASE

TOTAL RESISTANCE: 81.6

FOR	GRP/MOTOR	LAP COILS ✓	SPAN <i>1-3</i>	COIL SIZE
MANDREL <i># 83</i>	WT/GRP	CONC. COILS		<i>.550"</i>
RES./COIL	WT/MOTOR	SINGLE		
RES./GRP <i>20.4 Ω</i>	HALF LOOPS	BIFILAR		
COILS/GRP	STRAIGHT TIE	START		

REV	DESCRIPTION	DATE	APPROVED	CONTR NO. NAS8-39409		<div>AEROFLEX AN ARX COMPANY</div> <div>LABORATORIES INCORPORATED</div> <div>PLAINVIEW N.Y. 11803</div>		
B	INITIAL RELEASE			BY OR APPROVED	DATE			
C	REVISED PER GEN 11801	9-13-94		DWN I.H.	2-1-94	COIL WINDING		
				CHK				
				DES 	5/10/94			
				ENG				
				ENG 	5-13-94	SIZE A CAGE CODE 88379 DWG NO. 521-425 REV C		
	500-29-9	16187		PRJ 	5-13-94			
	NEXT ASSY	USED ON		QA 	5-13-94			
	APPLICATION			MFG 	5-12-94			
						SCALE		SHEET 1 OF 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	ZONE	REV	DESCRIPTION	DATE	APPROVED
500-29-9	16187		A	INITIAL RELEASE	7-20-94	<i>[Signature]</i>
STATOR NO.	FRAME SIZE	STACK HEIGHT	CLASS	FREQ	POLES	PHASE
500-29-9		.252			24	2
COUNT SLOTS	STITCHES BETWEEN LEADS		SEW WITH		E.S.	
LENGHT OF LEADS (CUTS)	GAGE AND TYPE	LEAD LENGHT FROM STATOR HEAD MIN	LEAD NUMBERS		SLOT NUMBERS	
74.0"	M22759/18-26-9	70.0"	WHITE (1)		1	
			WHITE (2)		2	
			WHITE (3)		47	
			WHITE (4)		48	
			11-13		24-36	
		CONNECT	12-14		35-37	
			23-25		36-38	
DESCRIPTION-LEADS	RESISTANCE	INDUCTANCE	BEFORE HI POT		AFTER	
			IMPREGNATION		IMPREGNATION	
WHITE (1) & (3)	82.2 Ω	28.4 MH	BET ϕ 'S			
WHITE (2) & (4)	82.3 Ω	28.5 MH				
			TO GND			
			250 VAC			
ROTATION AT LEAD END	FORMING TOP	BOTTOM		TOOL NO. TOP	BOTTOM	
MAIN 1	I.D.			H	H	
COM 2 & 3	O.D.			R	R	
CAP 4	HEIGHT			P	P	
PLUG GAGE	TYPE MARKERS	SLEEVING SIZE		LENGHT		
INSULATE JOINTS			INTERPHASE INSULATION			
COVER TOP			LEAD EMANATE			
COVER BOTTOM						

NOTES:
 TESTING SEQUENCE
 1. HI-POTENTIAL
 2. INDUCTANCE
 3. RESISTANCE

WINDING TYPE: _____

LEAD RESISTANCE = .30

CONTR NO. <i>NASB-39409</i>		<div style="font-size: 2em; font-weight: bold;">AEROFLEX</div> <div style="font-size: 0.8em;">AN ARX COMPANY</div>		LABORATORIES		PLAINVIEW.	
BY OR APPROVED				INCORPORATED		N.Y. 11803	
DWN <i>J.E</i>	DATE <i>7-20-94</i>	<div style="font-size: 1.5em; font-weight: bold;">FINISH DATA</div>					
CHK							
DES							
ENG							
ENG							
PRJ <i>[Signature]</i>	<i>7-20-94</i>	SIZE <i>A</i>	CAGE CODE <i>88379</i>	DWG NO. <i>522-472</i>	REV <i>A</i>		
QA <i>[Signature]</i>	<i>7-20-94</i>	SCALE		SHEET <i>1</i>			
MFG <i>[Signature]</i>	<i>7/20/94</i>						

08:43:33 28 OCT 1994
PARTS LIST - PL16187
MOTOR/ENCODER P/L
CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES
LONG ISLAND, NY 11803
CAGE NO. 88379

REV LTR B SINGLE BILL
REV DATE 05-13-94
SHT NO 1

CHK _____

ENG 

ECN _____

DES _____

MFG _____

QA _____

FND		QTY	PART OR		NOMEN & DESCRIPTION	REF DESIG	DOCUMENT	SEQ
LVL	NO	REQ	UM	CAGE				IDENT NO
0	1	1	EA		200-89	MOTOR/ENCODER ASSY		1

09:42:57 01 DEC 1994
PARTS LIST - PL200-89
MOTOR/ENCODER ASSY P/L
CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES
LONG ISLAND, NY 11803
CAGE NO. 88379

REV LTR E SINGLE BILL
REV DATE 11-30-94
SHT NO 1

CHK _____

ENG 

ECN 11869

DES _____

MFG _____

QA _____

LVL NO	FND	QTY	REQ UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	1	EA		301-60	HOUSING MOTOR/ENCODER			1
0	2	1	EA		403-1-7	BEARING DUPLEX			2
0	3	1	EA		500-29-9	STATOR ASSY			3
0	5	1	EA		303-216	PW ASSY TEMP XDCR FLTR CIRCUIT			4
0	6	1	EA		400-29-6	ROTOR ASSEMBLY			5
0	7	1	EA		607-448	BEARING RET-OUTER			6
0	8	1	EA		607-449	BEARING RET-INNER			7
0	9	1	EA		110E381	ENCODER-OPTICAL			8
0	10	1	EA		607-450	LOCKING PIN			9
0	11	1	EA		301-61	COVER			10
0	12	0	EA		MS51957-3	SCREW PNHD 2-56X.250		MS51957	11
0	13	4	EA	96906	MS15795-802	WASHER FLT #2		MS15795	12
0	14	6	EA		NAS620-C2	WASHER, FLAT #2 SM PAT		NAS620-C2	13
0	15	AR	OZ		612-38-2	STYCAST 2850FT/CATALYST#9			14
0	16	2	EA	96906	MS51957-2	SCREW PNHD 2-56X.187	REFERENCE	MS51957	15
0	18	AR	EA		285/CAT9	EPOXY THERMAL - ECCOBOND	REFERENCE		16
0	20	AR	EA		2850/CAT9	EPOXY ADHESIVE - STYCAST	REFERENCE		17
0	21	AR	LB		SN60WRMAP3	SOLDER	REFERENCE	QQ-S-571	18
0	26	AR	EA		5-068-0	BONDING PROCEDURE	REFERENCE		19
0	30	AR	EA		5-294-0	BONDING AND STAKING PROCEDURE	REFERENCE		20
0	33	AR	EA		5-297-0	ALIGNMENT AND ASSEMBLY PROC	REFERENCE		21
0	34	AR	EA		5-298-0	VACUUM BAKEOUT, POST ASSEMBLY	REFERENCE		22
0	41	AR	EA		ATP20049	ACCEPTANCE TEST PROCEDURE	REFERENCE		23
0	42	AR	EA		5-305-0	CLEANLINESS CONTROL PROC	REFERENCE		24
0	43	AR	EA		110P371	CONTAMINATION CTRL & IMPL PLAN			25
0	44	AR	FT		M22759/18-26-9	WIRE 26AWG WHITE		MIL-W-22759	26
0	45	AR	EA		PR-1564	POLYURETHANE PARTS A & B			27
0	46	AR	EA		5-283-0	SEALING PROCEDURE	REFERENCE		28

13:15:14 27 OCT 1994

PARTS LIST - PL301-60

HOUSING MOTOR/ENCODER P/L

CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES

LONG ISLAND, NY 11803

CAGE NO. 88379

REV LTR E SINGLE BILL

REV DATE 09-14-94

SHT NO 1

CHK

ENG

ECN 11461

DES

MEG

QA

FND	QTY		PART OR					SEN	
LVL	NO	REQ	U/L	CAGE	IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	NO
0	1	1	EA		301-60-01	HOUSING			1
0	2	1	EA		404-13-61	LINER BEARING			2
0	3	3	EA		M45932/1-7CL	INSERT SCREW 8-32UNC-2B		MIL-I-45932	3
0	4	10	EA		M45932/1-1CL	INSERT SCREW 2-56UNC-2B		MIL-I-45932	4
0	5	AR	EA		5-284-0	CLEANING PROCEDURE	REFERENCE		5
0	6	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		6

13:15:20 27 OCT 1994

PARTS LIST - PL 303-216

PW ASSY TEMP XDCR FLTR CKT P/L

CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES

LONG ISLAND, NY 11803

CAGE NO. 88379

REV LTR B

SINGLE BILL

REV DATE 09-14-94

SHT NO 1

CHK

ENG

ECN 11861

DES

MEG

QA

LVL	FND NO	QTY	REQ UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEIN NO
0	1	1	EA		303-217	P.W. BOARD			1
0	2	2	EA		RCR05G102JR	RESISTOR 1K +-5% 1/8W	R1,R2	MIL-R-3900H/4	2
0	3	1	EA		M39014/02-1358	CAPACITOR CER .33UF +-10% 50V	C1	MIL-C-39014/2	3
0	4	AR	OZ		SN63WRMAP3	SOLDER		WD-S-571	4
0	5	AR	FT		M22259/18-26-9	WIRE 26AWG WHITE		MIL-W-22259	5
0	6	AR	EA		M43553-I-WHT	WHITE EPOXY INK		MIL-I-43553	6
0	7	AR	EA		531-56	SCHEMATIC DIAGRAM	REFERENCE DRAWING		7
0	8	1	EA	51640	5962-8752103XX	TEMP XDCR	TC1		8
0	9	AR	EA		CONATHANE/CE-1155	CONFORMAL COAT, POLYURETHANE			9
0	10	AR	EA		5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY			10

REV LTR C SINGLE BILL
REV DATE 11-30-94
SHT NO 1

ECN 11869

QA

FND LVL NO	QTY REQ UM	CAGE	PART OR IDENT NO	NOMEN or DESCRIPTION	REF DESIG	DOCUMENT	SEQ NO
0	1	EA	402-29-9	ROTOR HUB & SHAFT			1
0	2	EA	411-291-2	COBALT MAGNETS NORTH			2
0	3	EA	411-291-3	COBALT MAGNETS SOUTH			3
0	4	AR EA	612-3	CEMENT BONDMASTER E645			4
0	5	AR EA	612-20	CEMENT BONDMASTER M620			5
0	6	AR EA	5-284-0	CLEANING PROCEDURE	REFERENCE		6
0	7	AR EA	5-258-0	MAGNET INSPECTION PROCEDURE	REFERENCE		7
0	8	AR EA	5-134-0	ROTOR CLEANING PROCEDURE	REFERENCE		8
0	9	AR EA	5-296-0	VACUUM BAKEOUT, PRE-ASSEMBLY	REFERENCE		9
0	10	AR EA	960-229	CEMENTING PROCEDURE	REFERENCE		10
0	11	AR EA	960-251	CEMENTING PROCEDURE	REFERENCE		11

13:15:43 27 OCT 1994

PARTS LIST - PL502-29-9

STATOR CORE P/L

CONTRACT NO. NAS8-39409

AEROFLEX LABORATORIES

LONG ISLAND, NY 11803

CAGE NO. 88379

REV LTR C

SINGLE BILL

REV DATE 09-14-94

SHT NO 1

CHK

ENG

ECN 11861

DES

MEG

QA

FND	QTY		PART OR				SEQ
LVL NO	REQ	UM	CAGE	IDENT NO	NOMEN or DESCRIPTION	REF DESIG	NO
0	1	18	EA	512-11-14	STEEL LAMINATION		1
0	2	AR	EA	612-3	CEMENT BONDMASTER E645		2
0	3	AR	LB	612-54	EPOXY POWDER, 5230 SCOTCH CAST		3
0	4	AR	EA	960-251	CEMENTING PROCEDURE	REFERENCE	4
0	5	AR	EA	5-222-0	BED COAT FLUID PROCEDURE	REFERENCE	5
0	6	AR	EA	5-128-0	STATOR CLEANING PROCEDURE	REFERENCE	6

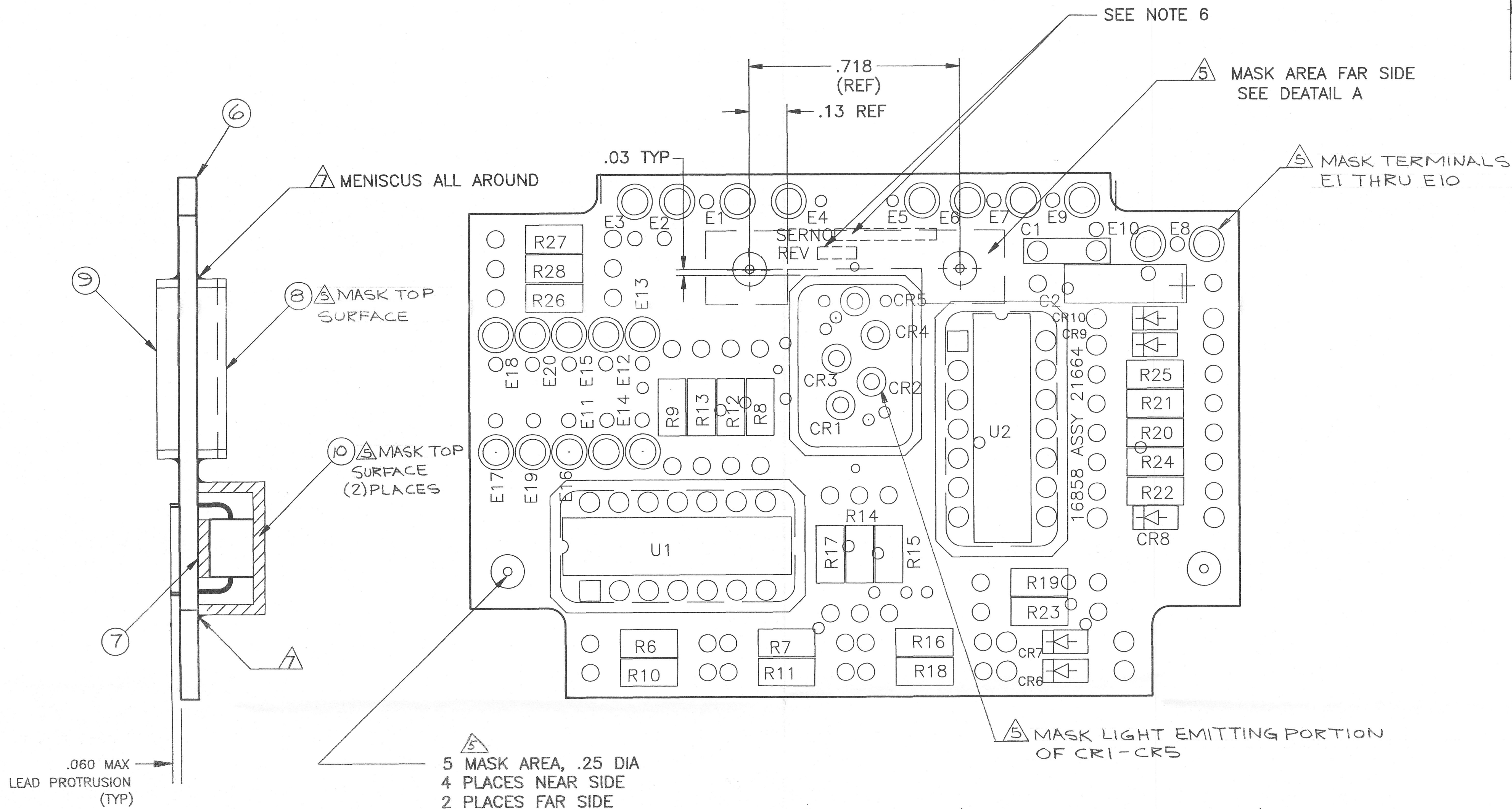
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A		INITIAL RELEASE		
B		ECN # 10128	6-2-94	<i>[Signature]</i>
C		ECN # 10218	10/24/94	<i>[Signature]</i>
D		REVISED PER MKX ECN 11869	11-30-94	<i>[Signature]</i>

D

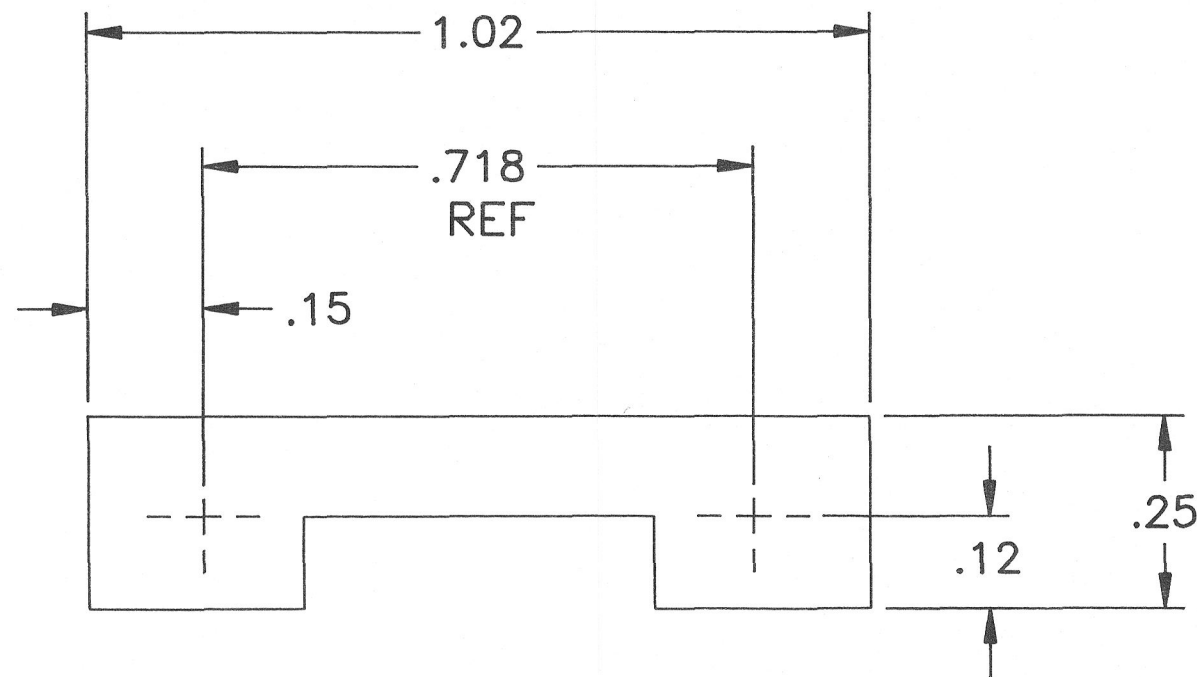
C

B

A



NOTE 7, AFTER FUNCTIONAL TEST, COAT CIRCUITRY AND IC LEADS UNDER SHIELDS ITEM 8 AND 10, AND BOND ALL SHIELDS, ITEMS 8, 9 AND 10 AS SHOWN TO PRINTED WIRING BOARD USING STYCAST 2651, CAT 9 PER 5-125-0. ITEM 10 (SHIELD) SHALL BE BONDED TO TOP SURFACE OF U1 AND U2. A MENISCUS OF EPOXY SHALL BE VISIBLE AROUND SHIELDS. NOTE, ITEM 7 SHALL BE BONDED TO PRINTED WIRING BOARD AND BOTTOM OF U1 AND U2.



DETAIL A
MASK AREA INDICATED
FAR SIDE

NOTES:

- USE PARTS LIST PL21664 TO CROSS REFERENCE COMPONENT REFERENCE DESIGNATIONS TO ITEM NUMBERS.
- ASSEMBLY AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH NHB5300.4(3) , PRINTED WIRING ASSEMBLIES AND THIS DRAWING.
- SOLDER PER NHB 5300.4 (3A-2) USING QQ-S-571.
- ELLIPTICALLY SWAGE TERMINALS ITEM 33 PER NHB5300.4(3A-2)
- CONFORMAL COAT BOTH SIDES OF ASSEMBLED CIRCUIT CARD PER NHB 5300.4 (3J). MASK AREAS INDICATED. CAUTION: DO NOT COAT LIGHT EMITTING PORTION OF CR1-CR5.
- MARKING TO BE .06 HIGH GOTHIC CHARACTER PER MIL-STD-130 USING ITEM 36 EPOXY INK PER MIL-I-43553.
A) AFTER SERNO ADD FOUR DIGIT SERIAL NUMBER BEGINING WITH 0001 RUNNING CONSECUTIVELY.
B) AFTER ASSY PART NO ADD DASH NUMBER AND REVISION STATUS OF THIS DRAWING.
- AFTER FUNCTIONAL TEST BOND SHIELDS ITEM 8, 9 AND 10 TO PRINTED WIRING BOARD USING STYCAST 2651 CAT 9 PER 5-036-0. LOCATED SHIELDS AS SHOWN. A MENISCUS OF EPOXY SHALL BE VISIBLE ALL AROUND SHIELD. ITEM 7 SHALL BE BOUNDED TO PC BOARD AND BOTTOM OF IC. (TYPICAL 2 PLACES)
- AFTER CONFORMAL COATING, VACUUM BAKE AND HANDLE PER 5-296-0

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 3 PLACE DECIMAL .005 4 PLACE DECIMAL .002 ANGULAR ±2°		CONTR NO	SEQUENTIAL ELECTRONIC SYSTEMS, INC.	
BREAK SHARP CORNERS .005 MAX R		BY OR APPROVED	DATE	ELMSFORD, N.Y.
ALL SURFACES TO BE		DWN	94/01/27	
MATERIAL		CHK		
FINISH		DESIGN		
APPLICATION		ENGRG	5-1-74	
NEXT ASSY		PROJ		
USED ON		QA		
		MFG		
		DO NOT SCALE DRAWING		
		SCALE	4/1	
		SIZE	CAGE CODE	
		D		
		DWG NO.	19868-21664	
		REV	D	
		SHEET	1 OF 2	

8

7

6

5

4

3

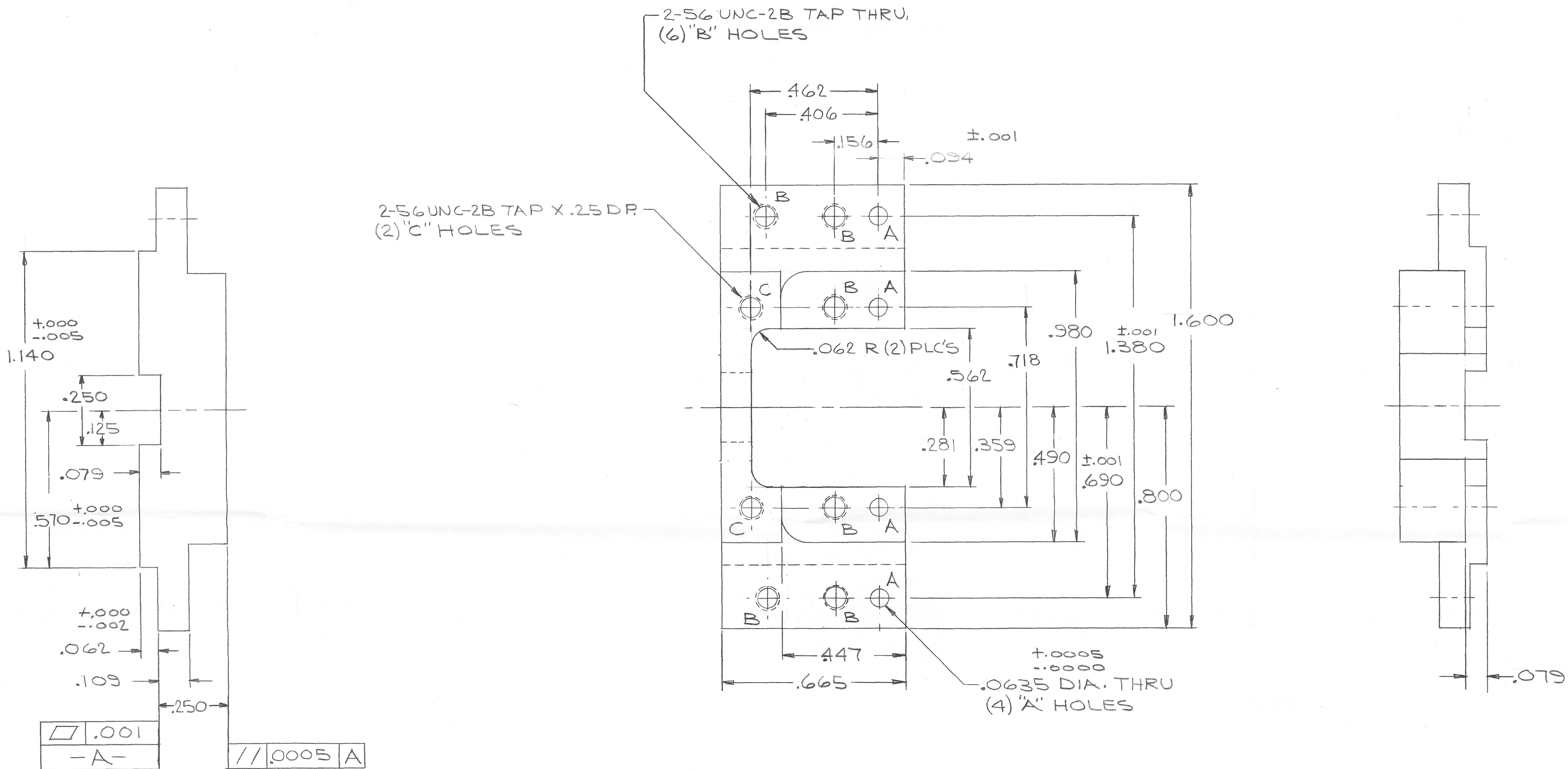
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1

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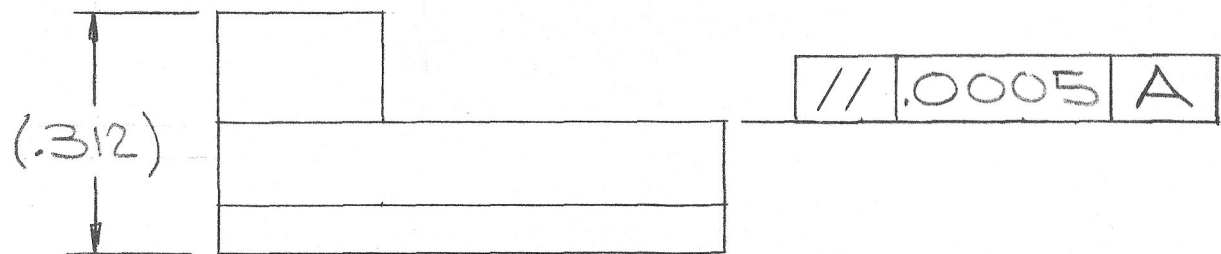
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	INITIAL RELEASE	11-25-93	JF



NOTES: UNLESS OTHERWISE SPECIFIED:

1. INTERPRET THIS DRAWING IAW DOD-STD-100C AND ANSI Y14.5M 1982.
2. MATERIAL: 6061-T6S11, AL ALY(ROD) PER QQ-A-200/8.
3. FINISH: CHEMICAL FILM (IRRIDITE-YELLOW) PER MIL-C-5541, CLASS 3.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005 R MAX.
5. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQT 9 AND THIS DWG.
6. SURFACE FINISH SHALL BE 125/ OR BETTER ALL OVER.



ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED			NAME		DATE		
DIMENSIONS ARE IN INCHES			APPROVED PROD. ENG.		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.		
TOLERANCES ON			APPROVED DES. ENG.				
FRACTIONS	DECIMAL DIMENSIONS	ANGLES	PROJECT ENGR				
± 1/64	.xx — ±.010 .xxx — ±.005	± 30'	2/11 10-22-93				
MATERIAL:			CHECKED				
NOTE 2			DRAWN		READOUT HOLDER SXI AEROFLEX		
MAT. SPEC.			JOSE VERE 10-15-93				
TREATMENT AND/OR FINISH			APPROVAL (DESIGN ACTIVITY)				
NOTE 3			OTHER APPROVAL				
			CODE IDENT. NO.				
			16858		D	19868-21672	A
			SCALE 4X1		SHEET 1 OF 1		

UNLESS OTHERWISE SPECIFIED	
MACHINED SURFACE FINISH TO BE \sqrt{V} R.M.S.	
MACHINED FILLET RADI TO HAVE SAME FINISH AS ADJACENT SURFACE.	
ALL FILLET RADI TO BE _____ R	
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.	
ALL CORNER RADI TO BE _____ R	
AS APPLICABLE WITHIN _____ F.I.R.	
SURFACES MUST BE CONCENTRIC	
SURFACES MUST BE FLAT & STRAIGHT	
SURFACES MUST BE SQUARE	
SURFACES MUST BE PARALLEL	

UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES	
TOLERANCES ON	
FRACTIONS	DECIMAL DIMENSIONS
$\pm 1/64$.001 - $\pm .010$
	.005 - $\pm .005$
ANGLES	
$\pm 30'$	
MATERIAL:	
NOTE 2	
MAT. SPEC.	
TREATMENT AND/OR FINISH	
NOTE 3	

NAME		DATE	
APPROVED PROD. ENG.			
APPROVED DES. ENG.			
PROJECT ENGR		2/11 10-22-93	
CHECKED			
DRAWN		JOSE VERE 10-15-93	
APPROVAL (DESIGN ACTIVITY)			
OTHER APPROVAL			
CODE IDENT. NO.		16858	
SIZE		D	
DWG. NO.		19868-21672	
REV		A	
SCALE 4X1			
SHEET 1 OF 1			

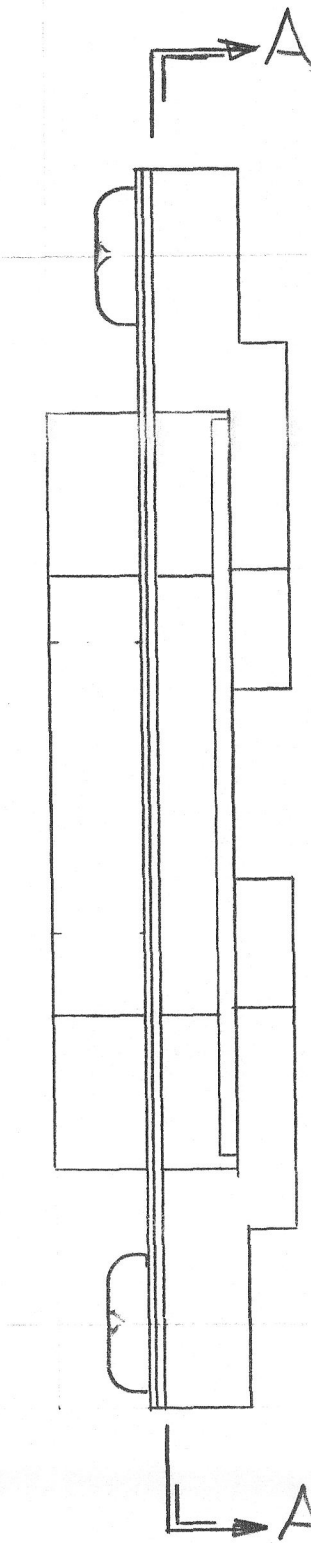
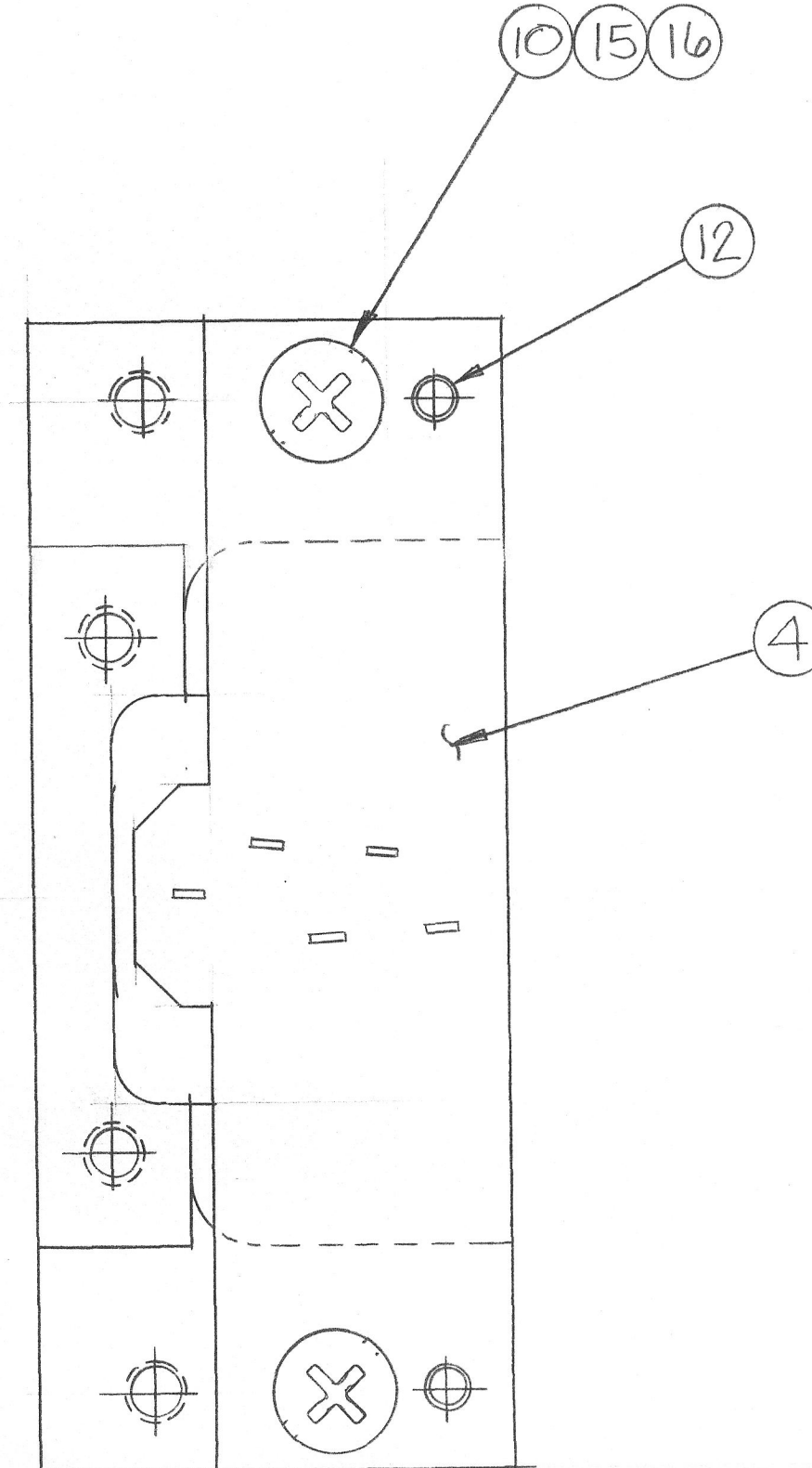
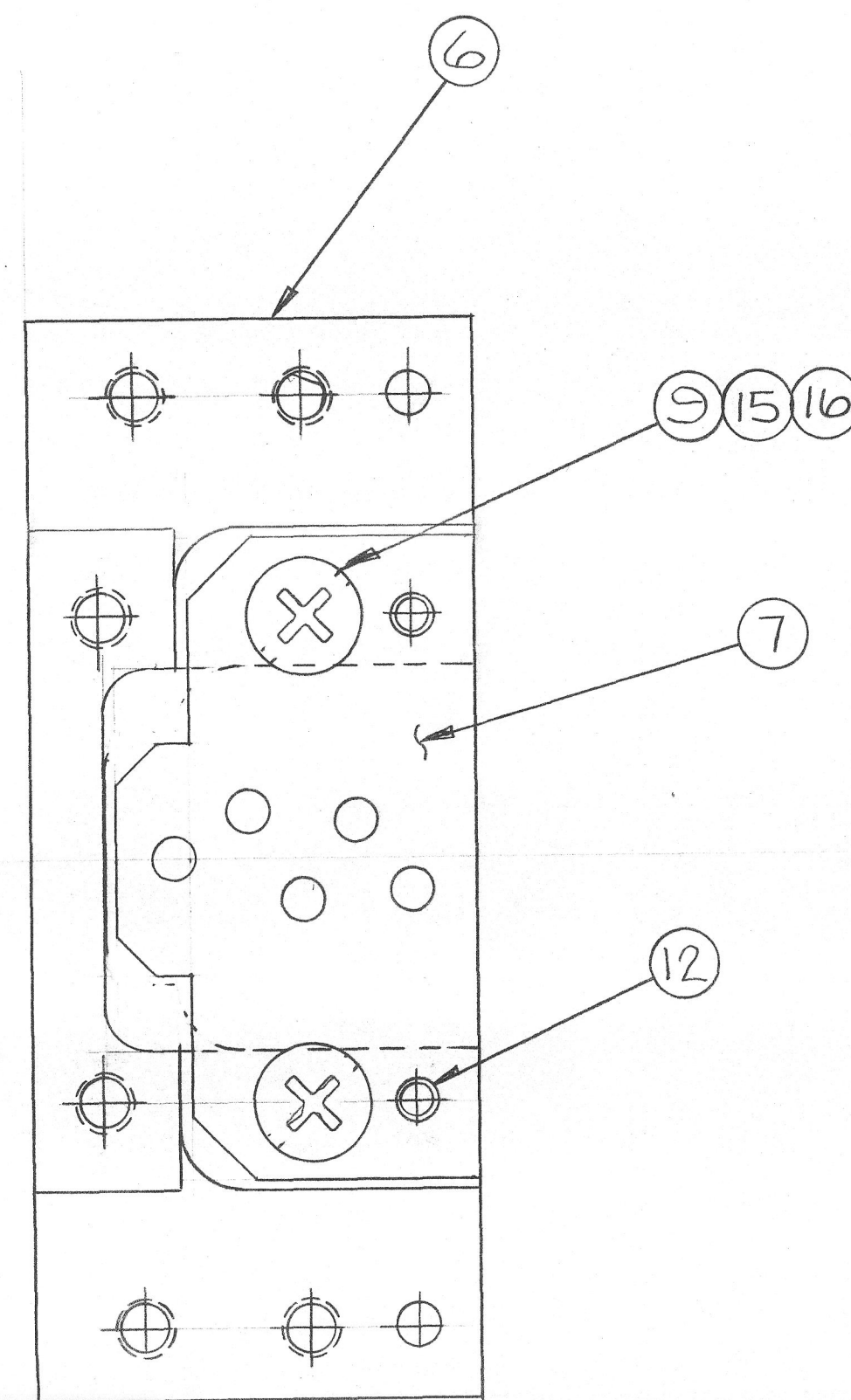
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVALS
A	ECN NO. 10217	10/24/94	<i>[Signature]</i>



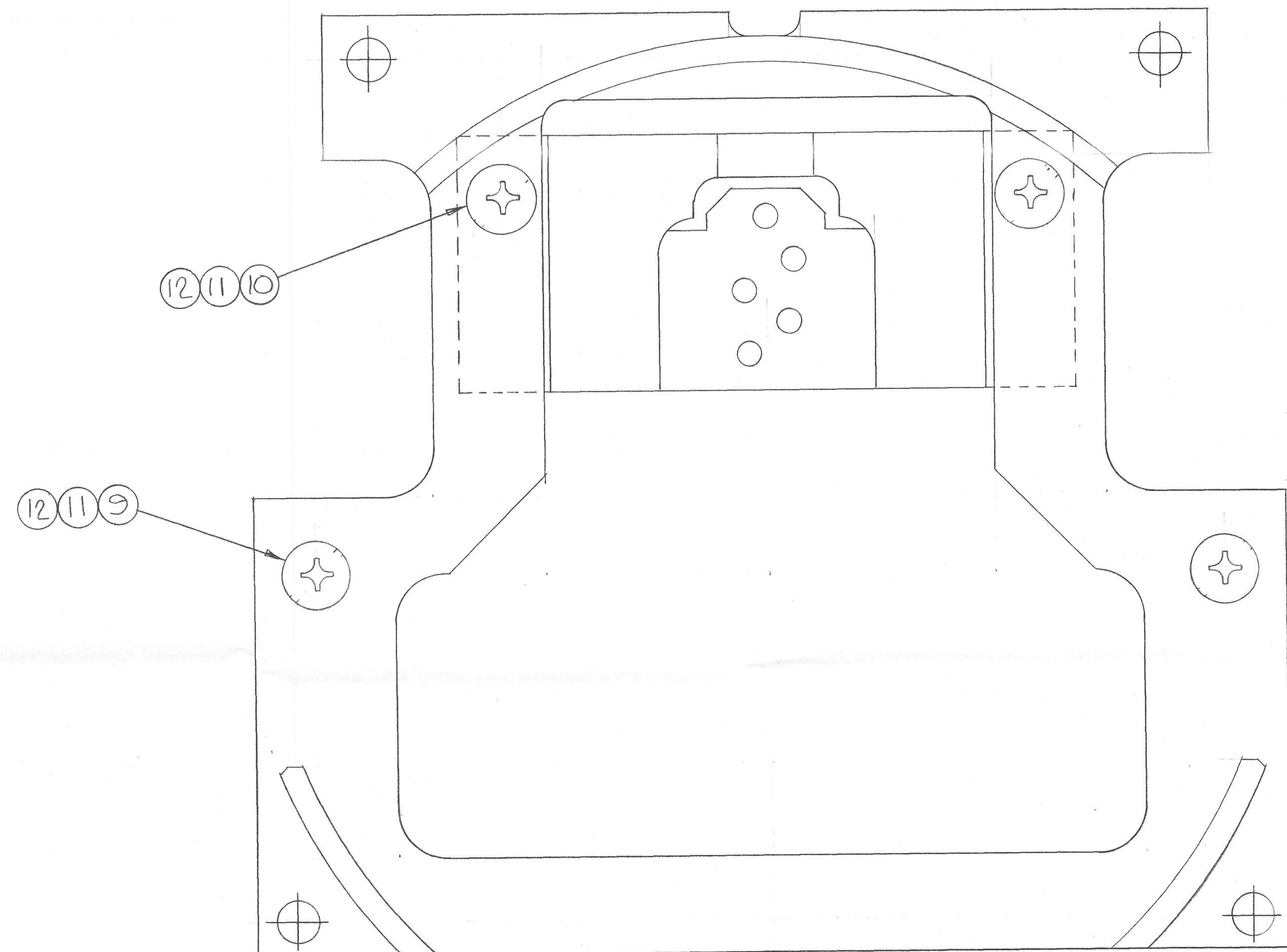
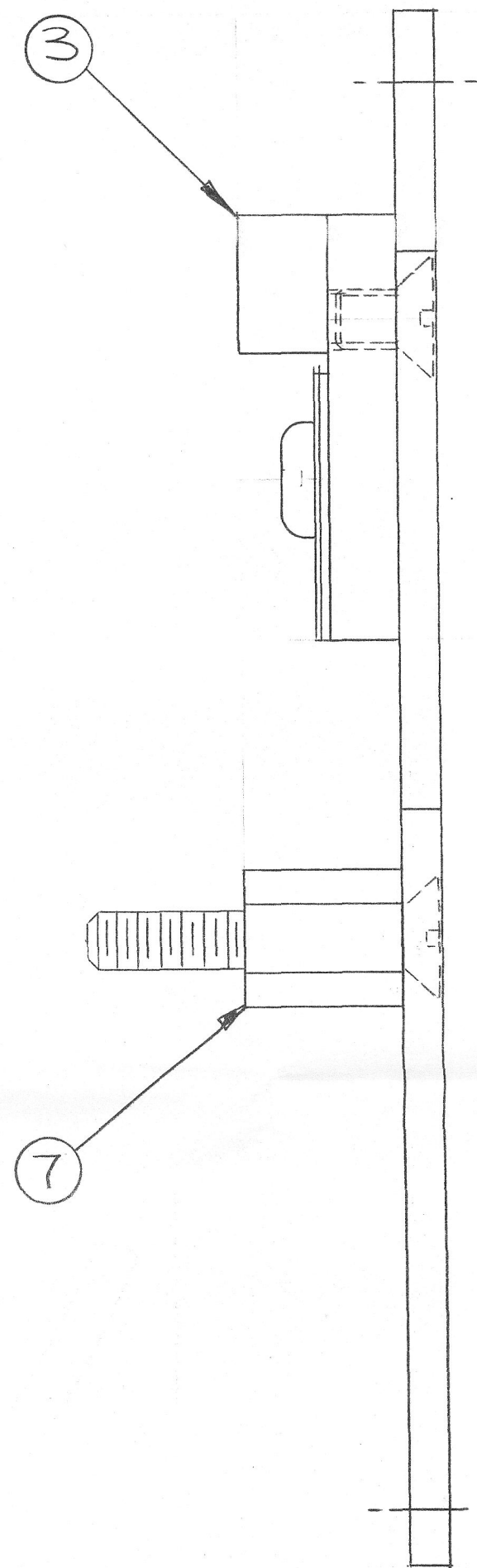
SECTION A-A

B | NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING IAW DOD-STD-100C
2. ASSEMBLY PROCEDURE:
 - a) ALIGN ITEM 7 (LED BD. ASSY) WITH ITEM 12 ($\frac{1}{16}$ ϕ DOWEL PIN) (2) REQ'D.
 - b) FASTEN WITH ITEM 9 (SCREW FLAT HEAD 82°), AND THREAD LOCK WITH ITEMS 15 & 16.
 - c) REMOVE ITEM 12 ($\frac{1}{16}$ ϕ DOWEL PIN).
 - d) ALIGN ITEM 4 (RETICLE/CARRIER ASSY) WITH ITEM 12 ($\frac{1}{16}$ ϕ DOWEL PIN) (2) REQ'D.
 - e) FASTEN WITH ITEM 10 (SCREW PAN HEAD), THREAD LOCK WITH ITEMS 15 & 16.
 - f) REMOVE ITEM 12 ($\frac{1}{16}$ ϕ DOWEL PIN)
 - g) MIX 100 PARTS OF ITEM 15 (STYCAST 2850 FT) WITH 3-4 PARTS OF ITEM 16 (CAT. 9)
 - h) CURE AT 65°C FOR 1-2 HRS.

	AR	16	CATALYST 9				EMERSON & CUMING, INC		
	AR	15	STY CAST		(BLK)	2850FT	EMERSON & CUMING, INC		
		14							
		13							
	REF	12	DOWEL PIN 1/16 DIA X 1/4 LG						
		11							
	2	10	SCREW PAN HEAD		2-56 X 1/8 LG	CRES	MS51957-1		
	2	9	SCREW FLAT HEAD 82°		2-56 X 1/8 LG	CRES	MS51959-1		
		8							
	1	7	LED PCB BOARD ASSY		19868-21774-1				
	1	6	READOUT HOLDER		19868-21672-1				
		5							
	1	4	RETICLE/CARRIER ASSY		19868-21763-1				
		3							
		2							
	X	1	READOUT ASSY		19868-21764-1				
-2	-1	ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
QTY. REQ.		LIST OF MATERIALS OR PARTS LIST							

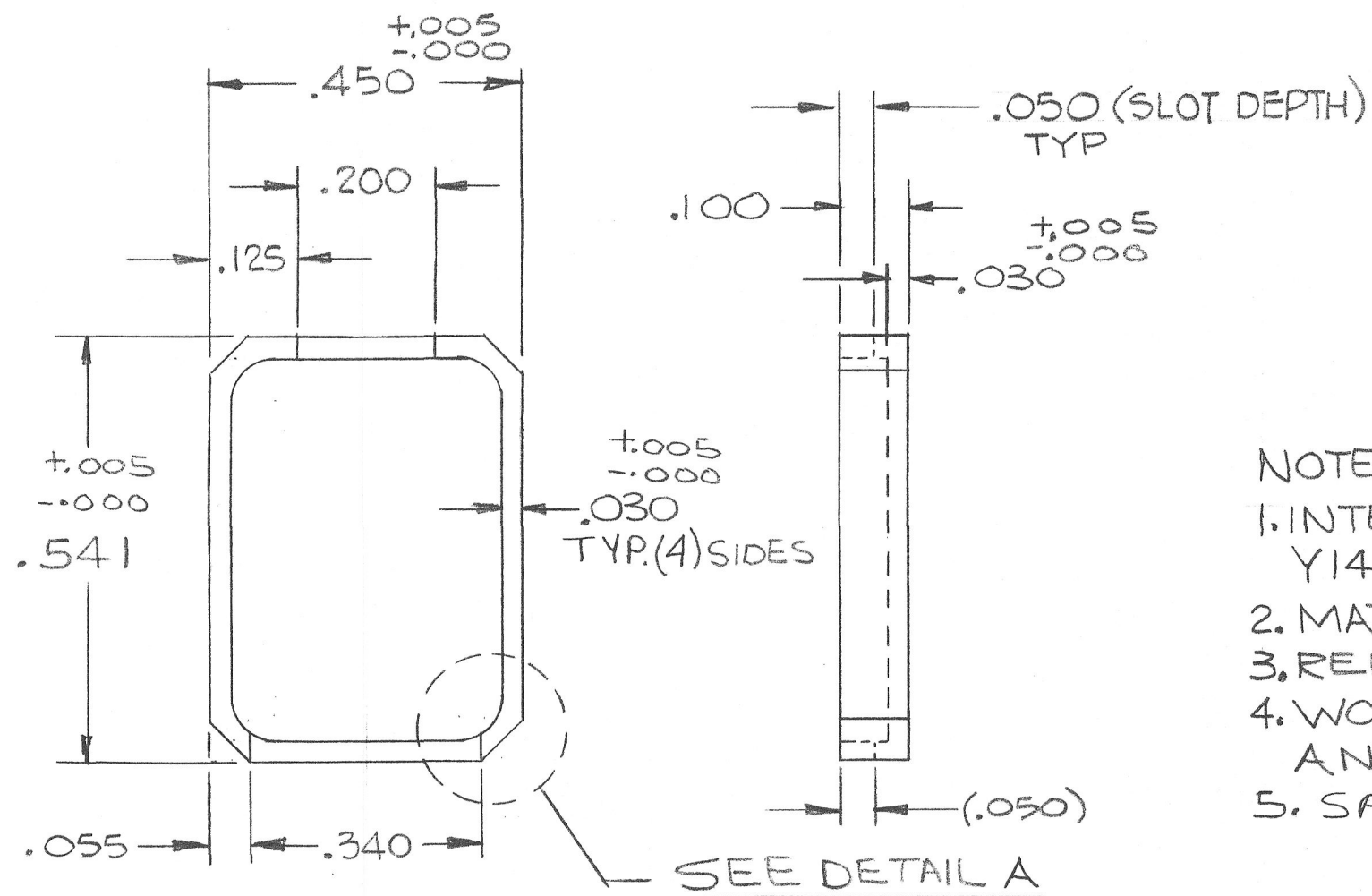
UNLESS OTHERWISE SPECIFIED			UNLESS OTHERWISE SPECIFIED			NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.						
MACHINED SURFACE FINISH TO BE $\sqrt{32}$ R.M.S.			DIMENSIONS ARE IN INCHES TOLERANCES ON			APPROVED PROD. ENG.				READOUT HOLDER ASSY SXI AEROFLEX						
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.			FRACTIONS		DECIMAL DIMENSIONS		ANGLES		APPROVED DES. ENG.							
ALL FILLET RADII TO BE _____ R			$\pm 1/64$		$.1X \pm .010$ $.1XX \pm .005$		$\pm 30^\circ$		PROJECT ENG'R					JLH 1-18-94		
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.			MATERIAL:			CHECKED										
ALL CORNER RADII TO BE _____ R						DRAWN		JOSEVERE		1-18-94						
AS APPLICABLE WITHIN _____ F.I.R.			19868-21765			MAT. SPEC.		APPROVAL (DESIGN ACTIVITY)		CODE IDENT. NO.		SIZE	DWG. NO.	REV		
<input checked="" type="radio"/> SURFACES MUST BE CONCENTRIC			<input type="radio"/> SURFACES MUST BE FLAT & STRAIGHT			TREATMENT AND/OR FINISH			16858		D	19868-21764		A		
<input type="radio"/> SURFACES MUST BE SQUARE			<input type="radio"/> SURFACES MUST BE ROUND													
<input type="radio"/> SURFACES MUST BE PARALLEL			<input type="radio"/> DESIGN IS SYMMETRICAL													
APPLICATION																
NO. REQ. PER UNIT						OTHER APPROVAL			SCALE 4X1				SHEET 1 OF 1			
STOCK NO.																



1. INTERPRET THIS DWG. IAW DOD-STD-100C
2. THREAD LOCK ALL FASTENERS WITH ITEM 13 AND 14.
 - a) MIX 100 PARTS OF ITEM 11 (2850FT) WITH 3-4 PARTS OF ITEM 12 (CAT. 9) BY WT.
 - b) CURE AT 65°C FOR 1-2 HRS.

12	AR	CATALYST S				EMERSON & CUMING, INC.	
11	AR	STYCAST	(BLK)	2850FT		EMERSON & CUMING, INC.	
10	2	SCREW FLAT Hd 82°		2-56 X 3/16 LG	CRES	M551959-2	
9	2	SCREW FLAT Hd 82°		2-56 X 1/2 LG	CRES	M351959-7	
8							
7	2	STANDOFF F/F		8102-SS-0256	3/16 HEX X 1/4 LG	AMATOM	
6							
5	1	PLATE		19868-21670			
4							
3	1	READOUT ASSY		19868-21764-1			
2							
1	X	ENC. MTG. PLATE ASSY		19868-21765-1			
ITEM	QTY	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.

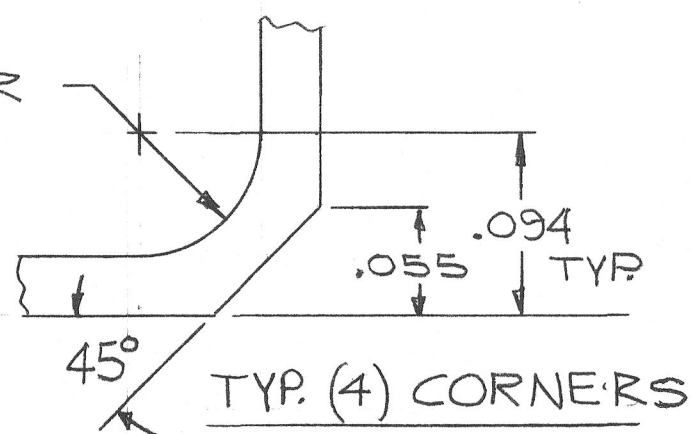
UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.							
MACHINED SURFACE FINISH TO BE $\sqrt{32}$ R.M.S.		DIMENSIONS ARE IN INCHES TOLERANCES ON		APPROVED PROD. ENG.				ENCODER MTG. PLATE ASSY SIX AEROFLEX							
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		FRACTIONS $\pm 1/64$		DECIMAL DIMENSIONS XX $\pm .010$ XXX $\pm .005$		ANGLES $\pm 30'$						APPROVED DES. ENG.			
ALL FILLET RADII TO BE _____ R		PROJECT ENGR													
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		MATERIAL:		CHECKED											
ALL CORNER RADII TO BE _____ R		MAT. SPEC.		DRAWN		JOSE VERE		1-18-94							
AS APPLICABLE WITHIN _____ F.I.R.		TREATMENT AND/OR FINISH		APPROVAL (DESIGN ACTIVITY)				CODE IDENT. NO.		SIZE	DWG. NO.	REV			
<input checked="" type="radio"/> SURFACES MUST BE CONCENTRIC <input type="radio"/> SURFACES MUST BE FLAT & STRAIGHT <input type="radio"/> SURFACES MUST BE ROUND <input type="radio"/> SURFACES MUST BE SQUARE <input type="radio"/> SURFACES MUST BE PARALLEL.		<input type="radio"/> SURFACES MUST BE FLAT & STRAIGHT <input type="radio"/> SURFACES MUST BE ROUND <input type="radio"/> SURFACES MUST BE SQUARE <input type="radio"/> SURFACES MUST BE PARALLEL.		APPLICATION				16858		D	19868-21765				
NO. REQ. PER UNIT		STOCK NO.				OTHER APPROVAL		SCALE 4X1		SHEET 1 OF 1					



DETAIL-A
SCALE: 10X1

- NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET THIS DWG. IAW MIL-STD-100E AND ANSI Y14.5 M 1982.
 2. MATERIAL: PURE TANTALUM
 3. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005R MAX.
 4. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ T 9 AND THIS DWG.
 5. SANDBLAST ALL SURFACES.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN # 10179	8-31-94	jll



UNLESS OTHERWISE SPECIFIED
MACHINED SURFACE FINISH TO BE \sqrt{R} M S
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE ALL FILLET RADII TO BE _____ R
REMOVE BURRS AND SHARP CORNERS .005 - .010 FROM MACHINED SURFACES. ALL CORNER RADII TO BE _____ R

- AS APPLICABLE WITHIN _____ F. I. R.
- ⊙ SURFACES MUST BE CONCENTRIC
 - ⊥ SURFACES MUST BE SQUARE
 - || SURFACES MUST BE PARALLEL
 - SURFACES MUST BE FLAT & STRAIGHT
 - SURFACES MUST BE ROUND
 - ≡ DESIGN IS SYMMETRICAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		
FRACTIONS	DECIMAL DIMENSIONS	ANGLES
$\pm \frac{1}{64}$.XX - $\pm .010$.XXX - $\pm .005$	$\pm 30^\circ$
MATERIAL NOTE 2 TREATMENT AND/OR FINISH NOTE 5		
MAT. SPEC.		

	NAME	DATE	SEQUENTIAL ELECTRONIC SYSTEMS,INC. ELMSFORD, N.Y.			
APPROVED PROD ENG			SHIELDING, L E D S ANODE SIDE SXI AEROFLEX			
APPROVED DES ENG						
PROJECT ENGR	JH	1-24-94				
CHECKED						
DRAWN	JOSE VERE	1-24-94				
APPLICATION						
NEXT ASSY	USED ON	CODE IDENT NO	SIZE	DWG. NO.	REV	
		16858	B	19868-21761	A	
NO. REQ. PER UNIT		SCALE 4X1	SHEET 1 OF 1			

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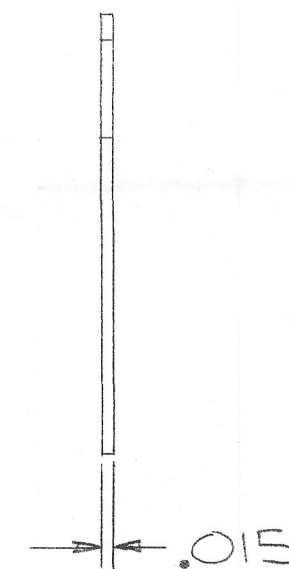
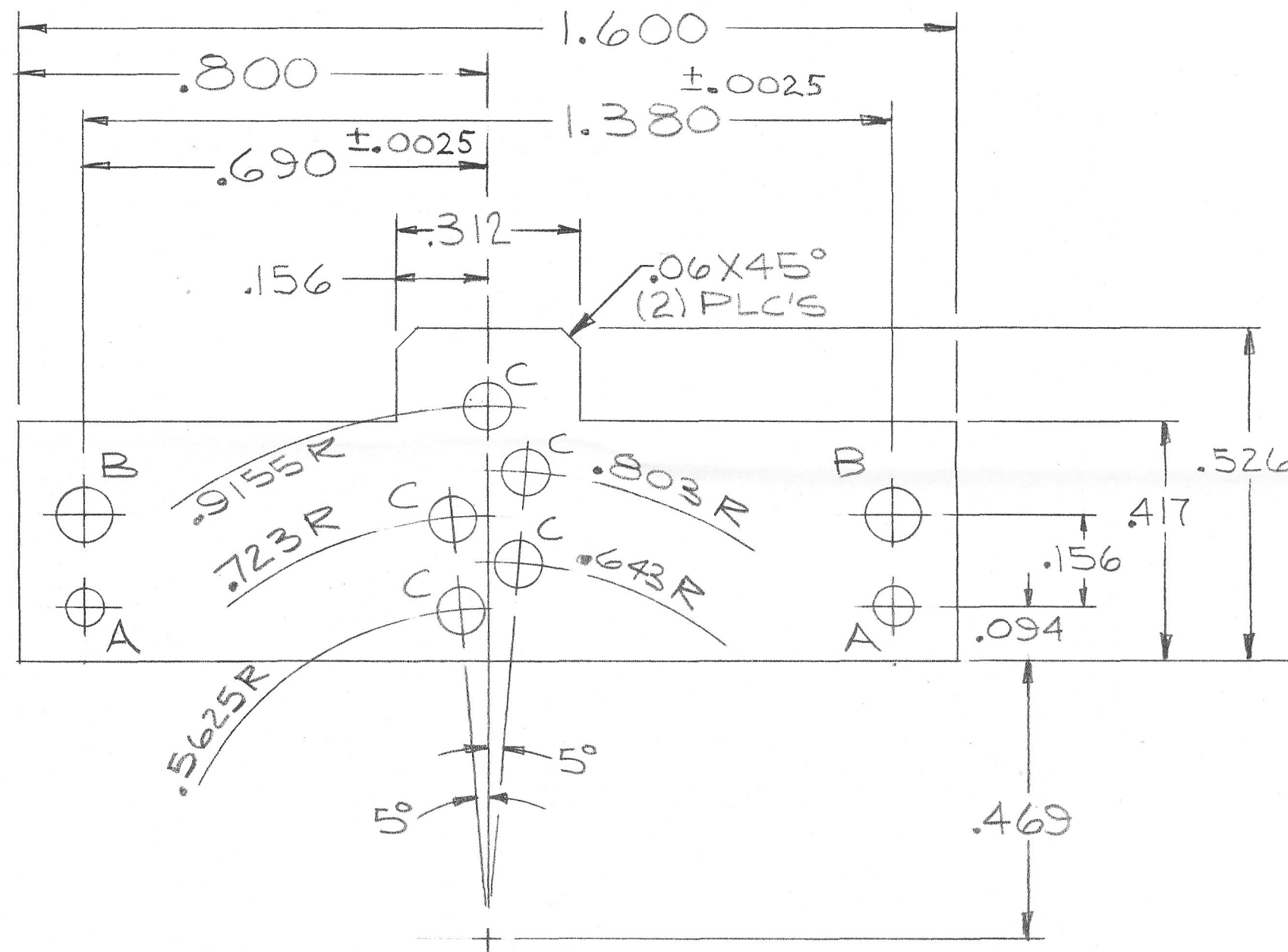
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVALS
A	ECN NO. 10094	3-11-94	JH



NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING IAW DOD-STD-100C AND ANSI Y14.5M 1982.
2. MATERIAL: .015 THK. BE CU #25, 1/2 HT, UNS NO. C17200.
3. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ 9 AND THIS DWG.
4. SURFACE FINISH SHALL BE 125/ OR BETTER ALL OVER.

HOLE LEGEND		
SYM	DESCRIPTION	QTY
A	.063 ±.005 DIA THRU	2
B	.094 DIA. THRU	2
C	.078 DIA THRU	5

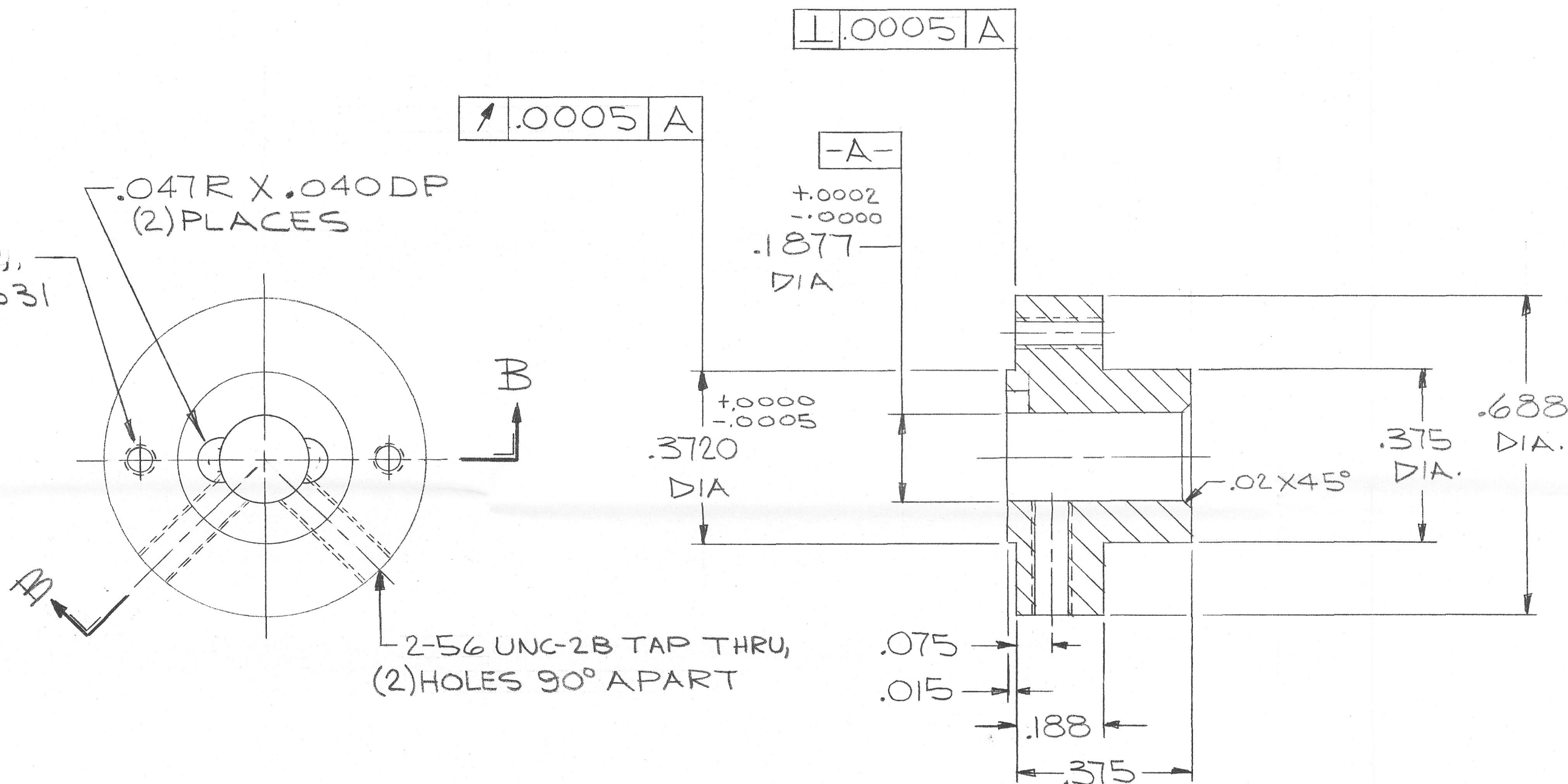
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED				NAME	DATE	SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.	
MACHINED SURFACE FINISH TO BE $\sqrt{125}$ R.M.S.				APPROVED PROD. ENG.		RETICLE, CARRIER	
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.				APPROVED DES. ENG.		SXI AEROFLEX	
ALL FILLET RADII TO BE _____ R				PROJECT ENG'R	JH 10-7-93		
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.				CHECKED			
ALL CORNER RADII TO BE _____ R				DRAWN	JOSE VERA 10-7-93		
AS APPLICABLE WITHIN _____ F.I.R.				APPROVAL (DESIGN ACTIVITY)		CODE IDENT. NO.	SIZE DWG. NO. REV
SURFACES MUST BE CONCENTRIC				OTHER APPROVAL		16858	C 19868-21666 A
SURFACES MUST BE SQUARE						SCALE 4X1	SHEET 1 OF 1
SURFACES MUST BE PARALLEL							
SURFACES MUST BE FLAT & STRAIGHT							
SURFACES MUST BE ROUND							
DESIGN IS SYMMETRICAL							
NEXT ASSY USED ON							
APPLICATION							
NO. REQ. PER UNIT							
STOCK NO.							
TREATMENT AND/OR FINISH							

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN NO. 10053	12-8-93	<i>jt</i>

O-80UNF-2B TAP THRU,
(2) HOLES ON A .531
DIA.



NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING IAW DOD-STD-100C AND ANSI Y14.5M 1982.
2. MATERIAL: CRES, TYPE 455, PER AMS 5617.
3. FINISH: CLEAR PASSIVATE PER QQ-P-35.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005R MAX.
5. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQTS 9 AND THIS DWG.
6. SURFACE FINISH SHALL BE 125/ OR BETTER ALL OVER.

ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED				NAME		DATE	
MACHINED SURFACE FINISH TO BE $\sqrt{32}$ R.M.S.				APPROVED PROD. ENG.			
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.				APPROVED DES. ENG.			
ALL FILLET RADII TO BE _____ R				PROJECT ENG'R			
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.				CHECKED			
ALL CORNER RADII TO BE _____ R				DRAWN		JOSE VERE 10-9-93	
AS APPLICABLE WITHIN _____ F.I.R.				APPROVAL (DESIGN ACTIVITY)			
SURFACES MUST BE CONCENTRIC				OTHER APPROVAL			
SURFACES MUST BE FLAT & STRAIGHT				CODE IDENT. NO.		SIZE	DWG. NO.
SURFACES MUST BE SQUARE				16858		C	19868-21680
SURFACES MUST BE PARALLEL				SCALE 4X1		SHEET 1 OF 1	
DESIGN IS SYMMETRICAL							

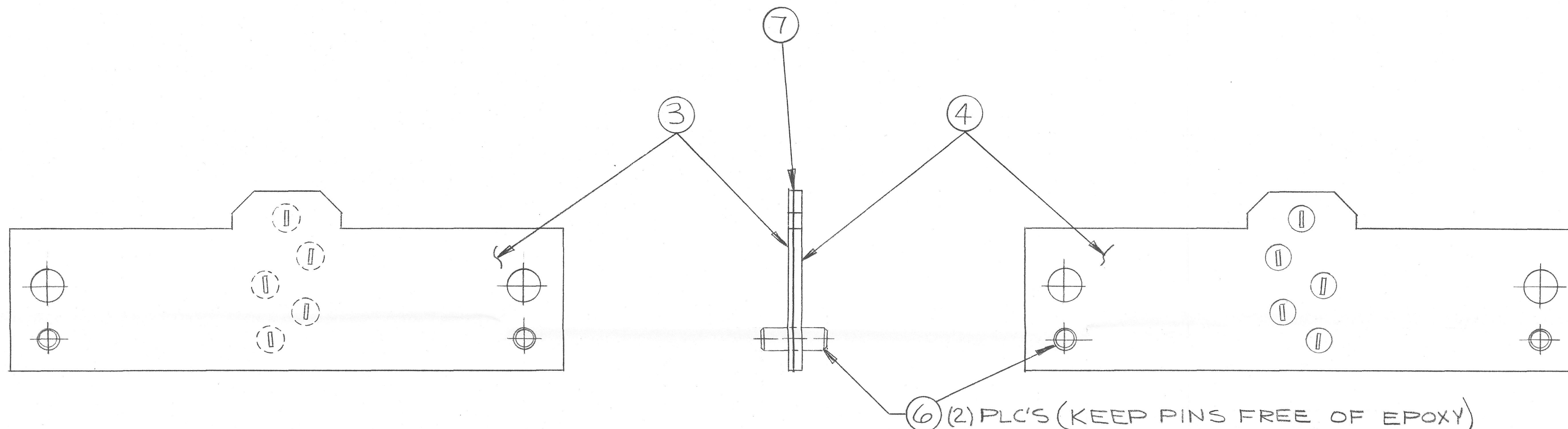
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVALS
A	ECN #10085	2-27-94	



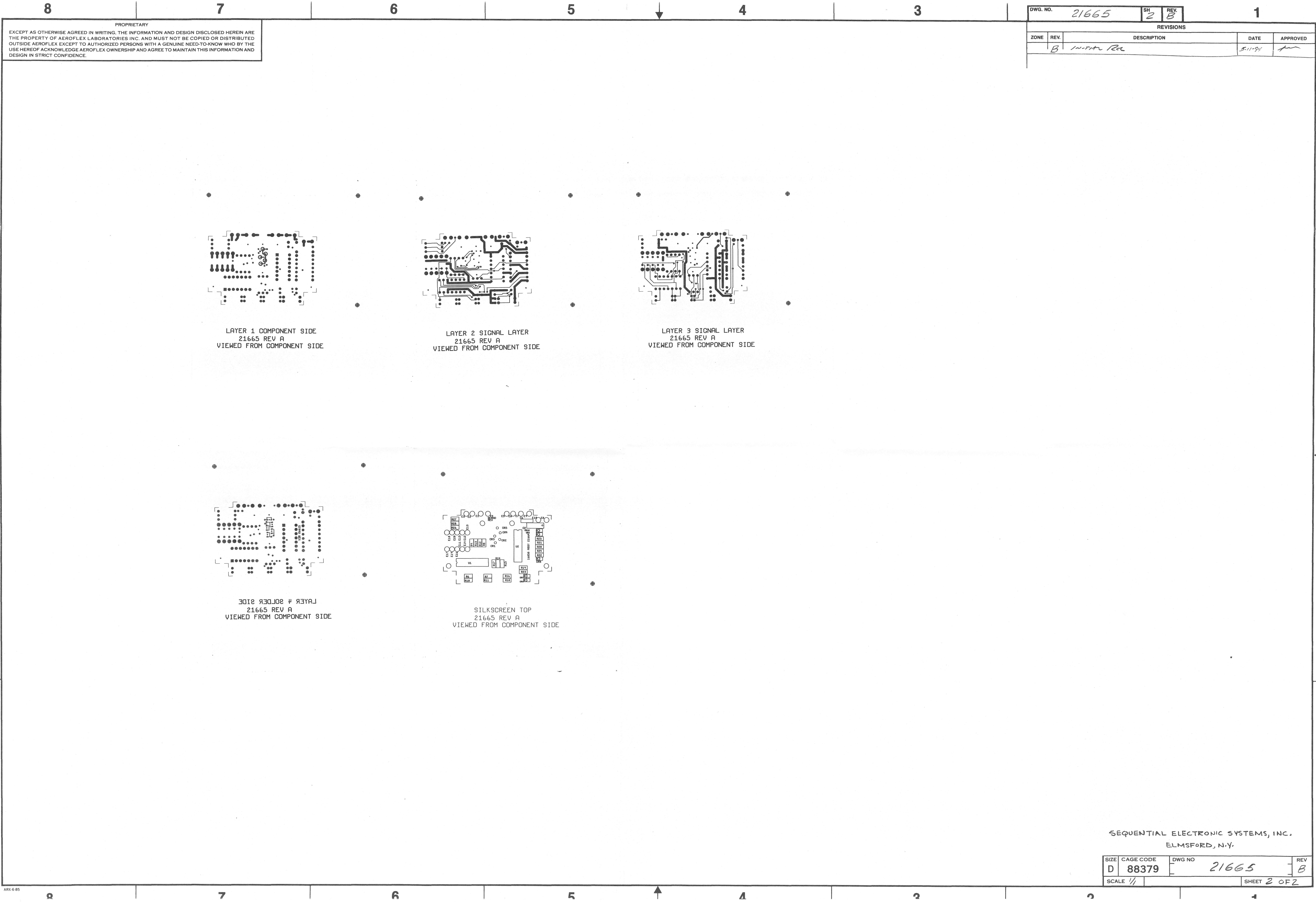
NOTES: UNLESS OTHERWISE SPECIFIED

- INTERPRET THIS DWG. IAW DOD-STD-100C.
- ALIGN ITEM 3 AND ITEM 4 USING ITEM 6 ($\frac{1}{16}$ DOWEL PIN)
- CEMENT WITH ITEM 7 (ADHESIVE, EPOXY)
 - MIX (7) PARTS OF "A" WITH (3) PARTS OF "B" (BY WT. OR VOL.)
 - CURE ASSY FOR 30 MIN. @ 90°C.
 - REMOVE ITEM 6 DOWEL PINS AFTER CURE.

7	AR	ADHESIVE, EPOXY		A-271		ARMSTRONG	
6	REF	DOWEL PIN		$\frac{1}{16}$ DIA. X $\frac{1}{4}$ LG			
5							
4	1	RETICLE CARRIER		19868-21666			
3	1	RETICLE		19868-21787			
2							
1	X	RETICLE/CARRIER ASSY		19868-21763-1			
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.

LIST OF MATERIALS OR PARTS LIST


UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.				
MACHINED SURFACE FINISH TO BE $\frac{1}{32}$ R.M.S.		DIMENSIONS ARE IN INCHES		APPROVED PROD. ENG.				RETICLE & RETICLE CARRIER ASSY SXI AEROFLEX				
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON		APPROVED DES. ENG.								
ALL FILLET RADII TO BE _____ R		FRACTIONS DECIMAL DIMENSIONS ANGLES		PROJECT ENG'R		1-14-94						
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		$\pm 1/64$ XX $\pm .010$ XXX $\pm .005$ $\pm 30'$		CHECKED								
ALL CORNER RADII TO BE _____ R		MATERIAL:		DRAWN		JOSE VERE 1-14-94						
AS APPLICABLE WITHIN _____ F.I.R.		MAT. SPEC.		APPROVAL (DESIGN ACTIVITY)				CODE IDENT. NO.		SIZE	DWG. NO.	REV
SURFACES MUST BE CONCENTRIC		19868-21764						16858		C	19868-21763	A
SURFACES MUST BE FLAT & STRAIGHT		NEXT ASSY		TREATMENT AND/OR FINISH				SCALE 4X1		SHEET 1 OF 1		
SURFACES MUST BE SQUARE		APPLICATION										
SURFACES MUST BE PARALLEL		NO. REQ. PER UNIT										
		STOCK NO.										

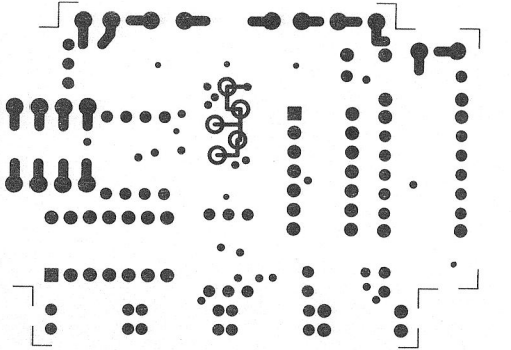


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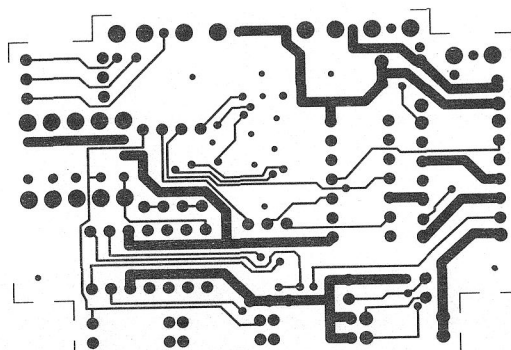
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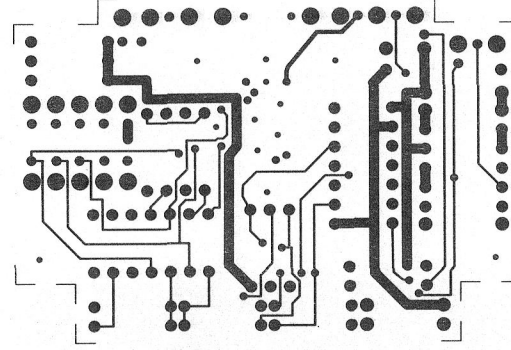
DWG. NO. 21665		SH 2	REV. B	1	
REVISIONS					
ZONE	REV.	DESCRIPTION		DATE	APPROVED
	B	INITIAL REV		5-11-94	



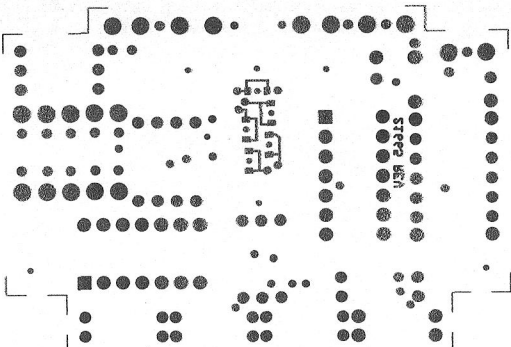
LAYER 1 COMPONENT SIDE
21665 REV A
VIEWED FROM COMPONENT SIDE



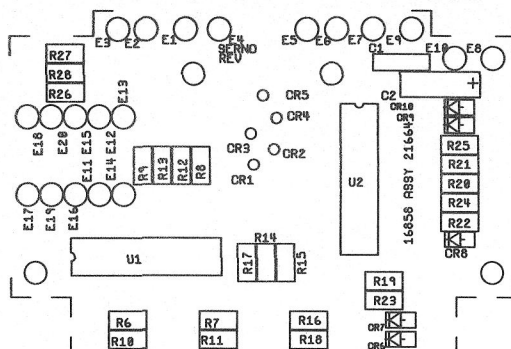
LAYER 2 SIGNAL LAYER
21665 REV A
VIEWED FROM COMPONENT SIDE



LAYER 3 SIGNAL LAYER
21665 REV A
VIEWED FROM COMPONENT SIDE



LAYER 4 COMPONENT SIDE
21665 REV A
VIEWED FROM COMPONENT SIDE

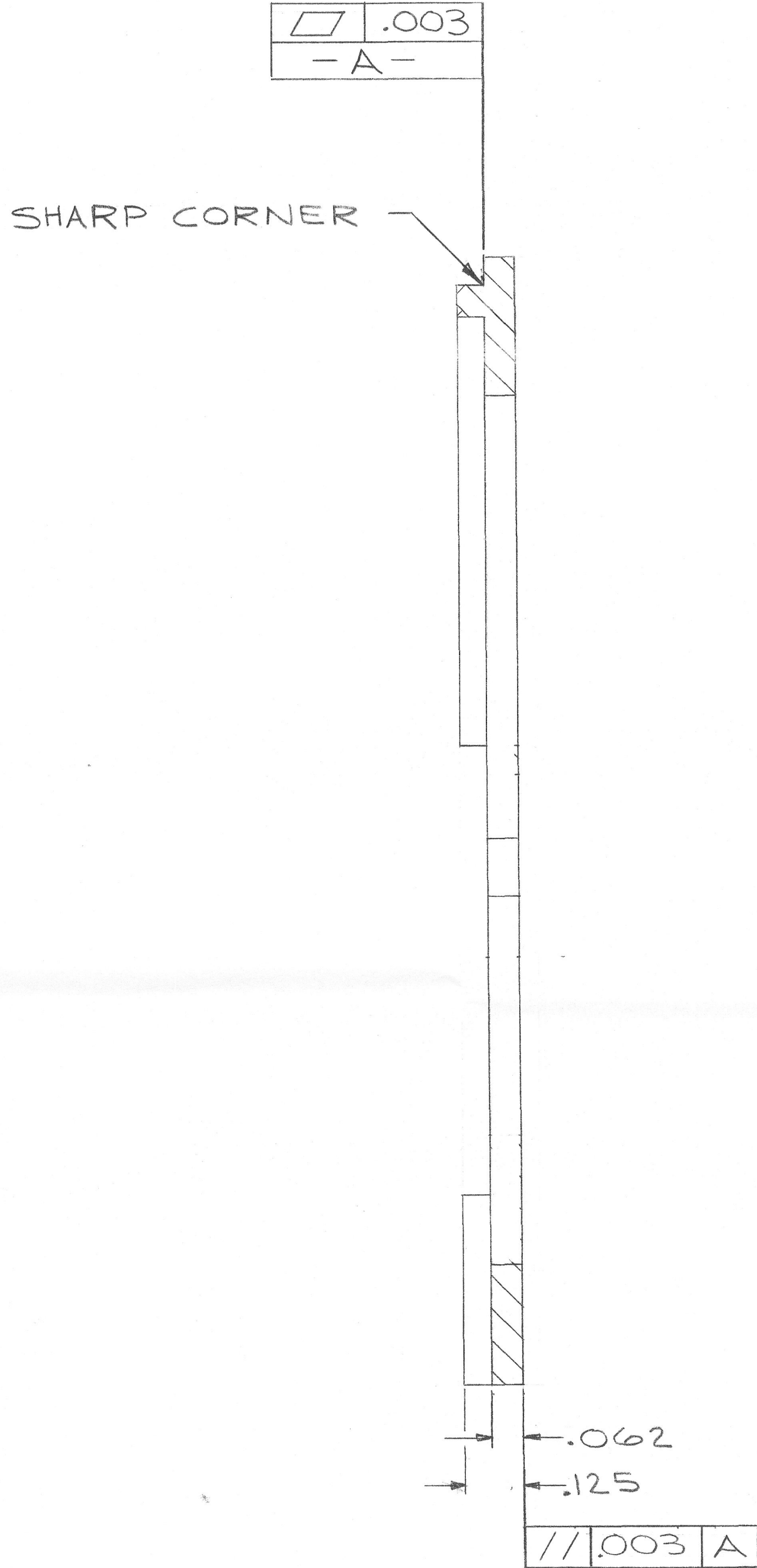
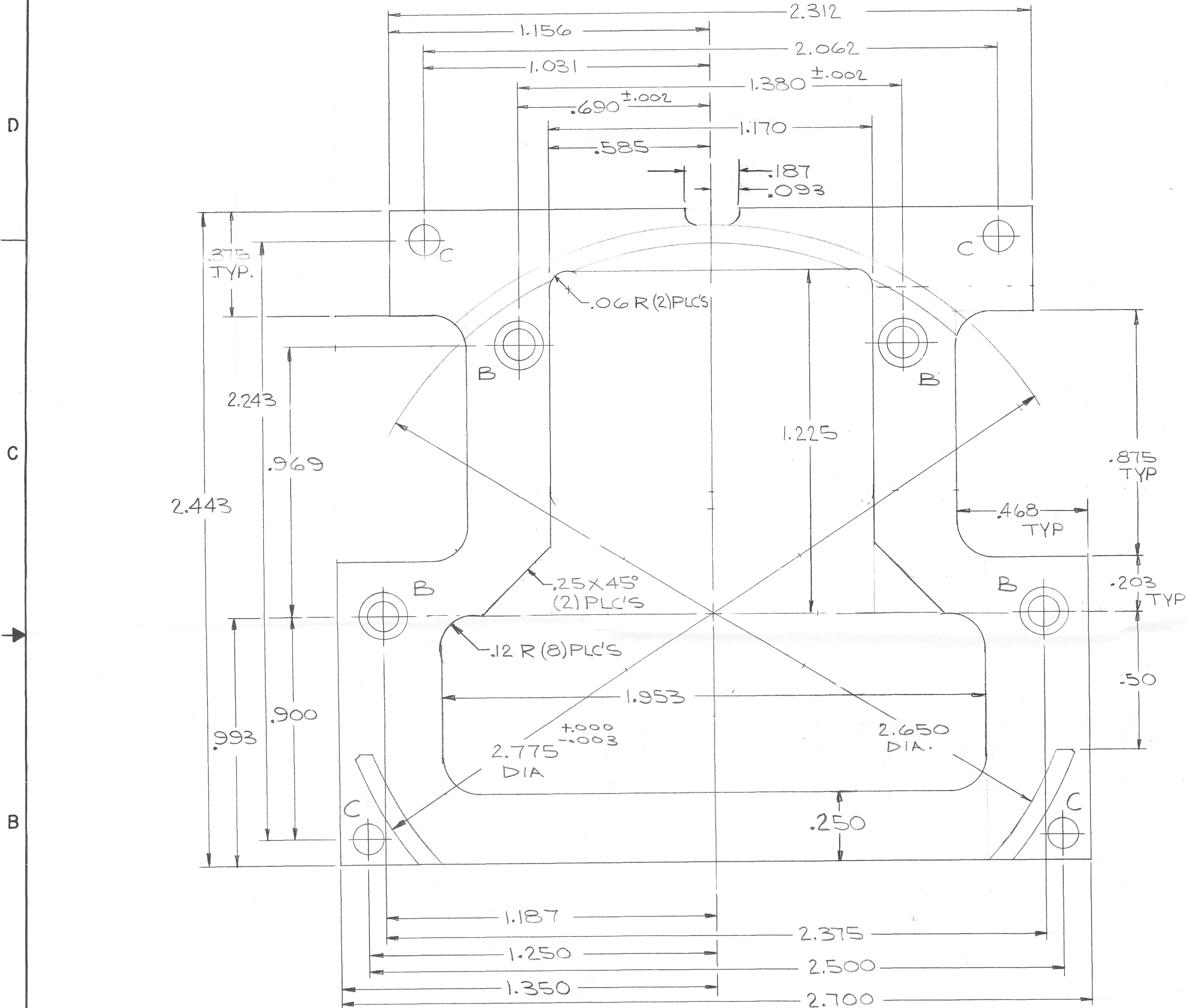


SILKSCREEN TOP
21665 REV A
VIEWED FROM COMPONENT SIDE

SEQUENTIAL ELECTRONIC SYSTEMS, INC.
ELMSFORD, N.Y.

SIZE D	CAGE CODE 88379	DWG NO 21665	REV B
SCALE 1/1		SHEET 2 OF 2	

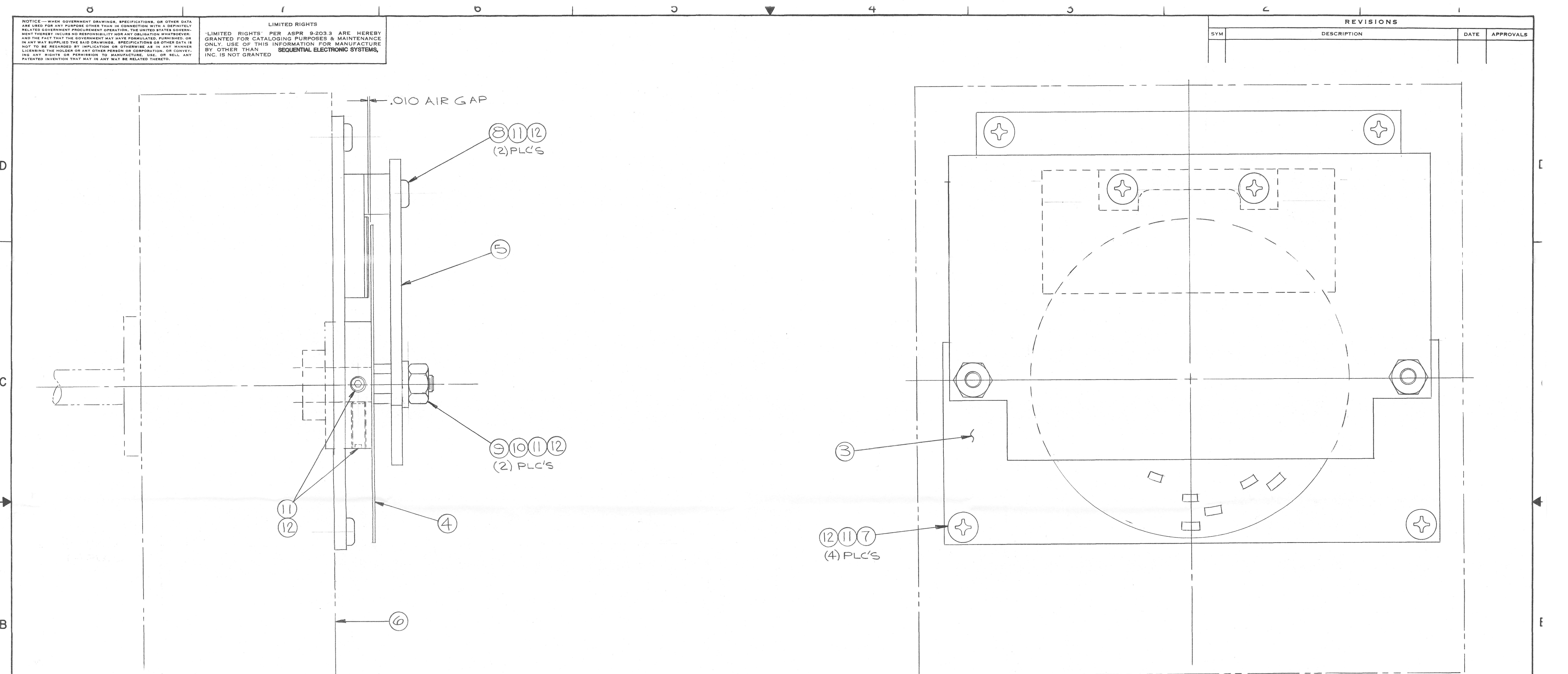
ARX-685
AEROFLEX LABORATORIES, INC., ELMSFORD, N.Y. 07033



C	.109 DIA. THRU	4
B	.109 DIA. THRU, 82° C'S SINK TO .179 Φ	4
SYM	DESCRIPTION	QTY
HOLE LEGEND		

- NOTES: UNLESS OTHERWISE SPECIFIED.
1. INTERPRET THIS DRAWING IAW DOD-STD-100C AND ANSI Y14.5M 1982.
 2. MATERIAL: 6061-T6, AL ALY PER QQ-A-250/11.
 3. FINISH: CHEMICAL FILM (IRIDITE-YELLOW) PER MIL-C-5541, CLASS 3.
 4. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005 R MAX.
 5. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQT 9 AND THIS DWG.
 6. SURFACE FINISH SHALL BE 125/ OR BETTER ALL OVER.

ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED				NAME DATE			
MACHINED SURFACE FINISH TO BE $\sqrt{125}$ R.M.S.				APPROVED PROD. ENG.			
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.				APPROVED DES. ENG.			
ALL FILLET RADII TO BE _____ R				PROJECT ENGR			
REMOVE BURRS AND SHARP CORNERS .005 - .010 FROM MACHINED SURFACES.				CHECKED			
ALL CORNER RADII TO BE _____ R				DRAWN			
AS APPLICABLE WITHIN _____ F.I.R.				APPROVAL (DESIGN ACTIVITY)			
SURFACES MUST BE CONCENTRIC				OTHER APPROVAL			
SURFACES MUST BE FLAT & STRAIGHT				NO. REQ. PER UNIT			
SURFACES MUST BE SQUARE				STOCK NO.			
SURFACES MUST BE PARALLEL				TREATMENT AND/OR FINISH			
DESIGN IS SYMMETRICAL				NOTE 2			
				NOTE 3			
				MATERIAL:			
				MAT. SPEC.			
				APPROVED PROD. ENG.			
				APPROVED DES. ENG.			
				PROJECT ENGR			
				CHECKED			
				DRAWN			
				APPROVAL (DESIGN ACTIVITY)			
				OTHER APPROVAL			
				CODE IDENT. NO.			
				SIZE			
				DWG. NO.			
				REV			
				SCALE 4X1			
				SHEET 1 OF 1			



NOTES: UNLESS OTHERWISE SPECIFIED:

1. INTERPRET THIS DRAWING IAW DOD-STD-100C.
2. ASSEMBLY PROCEDURE:
 - a) INSTALL ITEM 3 (PLATE ASSY) IN PLACE AND FASTEN WITH ITEM 7 (SCREW PAN HD.) AND THREAD LOCK WITH ITEM 11 (STYCAST 2850 FT) AND ITEM 12 (CAT. 9).
 - b) INSTALL ITEM 4 (DISC & HUB ASSY) INTO SHAFT, ALLOW .010 AIR GAP BETWEEN DISC & RETICLE. FASTEN (2) SOC. HD. SET SCREW IN HUB & THREAD LOCK WITH ITEM 11 (STYCAST 2850 FT) AND ITEM 12 (CAT. 9).
 - c) INSTALL ITEM 5 (PWR BD. ASSY) AND FASTEN WITH ITEM 8 (SCREW PAN HD.) AND ITEM 10 (HEX NUT) THREAD LOCK WITH ITEM 11 (STYCAST 2850 FT) AND ITEM 12 (CAT. 9).
 - d) MIX 100 PARTS OF ITEM 11 (STYCAST 2850 FT) WITH 3-4 PARTS OF ITEM 12 (CAT. 9).
 - e) CURE AT 65°C FOR 1-2 HRS.

12	AR	CATALYST 9					EMERSON & CUMING, INC.
11	AR	STYCAST	2850 FT				EMERSON & CUMING, INC.
10	2	HEX NUT	2-56	CRES	MS35649-224		
9	2	FAT WASHER	#2	CRES	MS15735-802		
8	2	SCREW-PAN HEAD	2-56 X 1/4 LG	CRES	MS51957-3		
7	4	SCREW-PAN HEAD	2-56 X 5/16 LG		MS51957-4		
6	1	MOTOR ASSY			AEROFLEX		
5	1	PWR BD ASSY			AEROFLEX		
4	1	DISC & HUB ASSY	19868-21766-1				
3	1	PLATE ASSY	19868-21765-1				
2							
1	X	ENCODER ASSY	19868-21770-1				
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC.	
MACHINED SURFACE FINISH TO BE 637 R.M.S.		DIMENSIONS ARE IN INCHES		APPROVED PROD. ENG.				ELMSFORD, N.Y.	
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON		APPROVED DES. ENG.				ENCODER ASSY	
ALL FILLET RADII TO BE R		FRACTIONS DECIMAL DIMENSIONS ANGLES		PROJECT ENGR		1-24-94		SXI AEROFLEX	
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		± 1/64 .XX ± .010 .XXX ± .005 ± 30'		CHECKED					
ALL CORNER RADII TO BE R		MATERIAL:		DRAWN		JOSE VERO 1-24-94			
AS APPLICABLE WITHIN F.I.R.		MAT. SPEC.		APPROVAL (DESIGN ACTIVITY)				CODE IDENT. NO. SIZE DWG. NO. REV	
SURFACES MUST BE CONCENTRIC		NEXT ASSY USED ON		OTHER APPROVAL				16858 D 19868-21770	
SURFACES MUST BE FLAT & STRAIGHT		APPLICATION						SCALE 4X1 SHEET 1 OF 1	
SURFACES MUST BE SQUARE		NO. REQ. PER UNIT							
SURFACES MUST BE PARALLEL		STOCK NO.							

4

3

2

1

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REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	B	INITIAL RELEASE	5-11-94	

D

D

C

C

B

B

A

A

LAYER 1 COMPONENT SIDE
21775 REV A
VIEWED FROM COMPONENT SIDE

3012 930J02 S 93YAJ
21775 REV A
VIEWED FROM COMPONENT SIDE

SILKSCREEN TOP
21775 REV A
VIEWED FROM COMPONENT SIDE

SEQUENTIAL ELECTRONIC SYSTEMS, INC.
ELMSFORD, N.Y.

SIZE	CAGE CODE	DWG NO	REV
C	88379	21775	B
SCALE	1/1	SHEET	2 OF 2

ARX-4-85

4

3

2

1

DWG. NO.

21774

SH

2

REV

B

AEROCO, HICKSVILLE, N.Y., 081272

4

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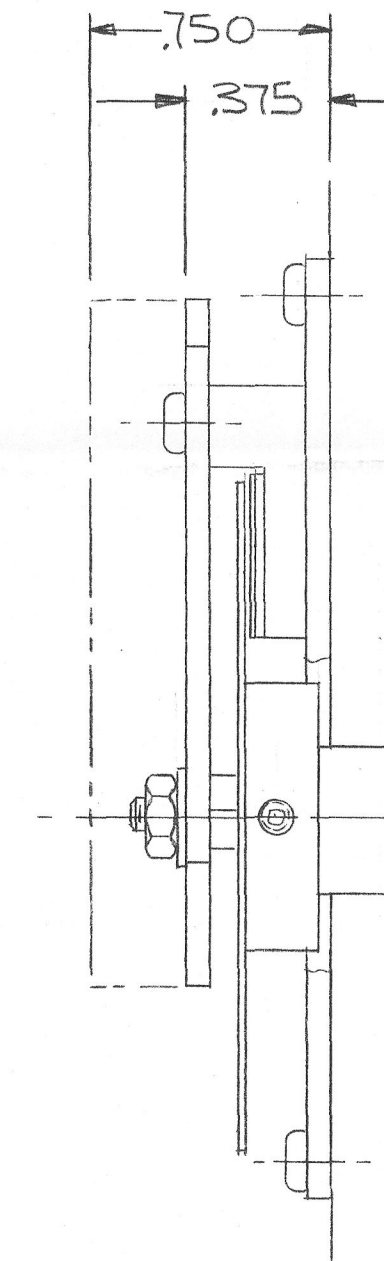
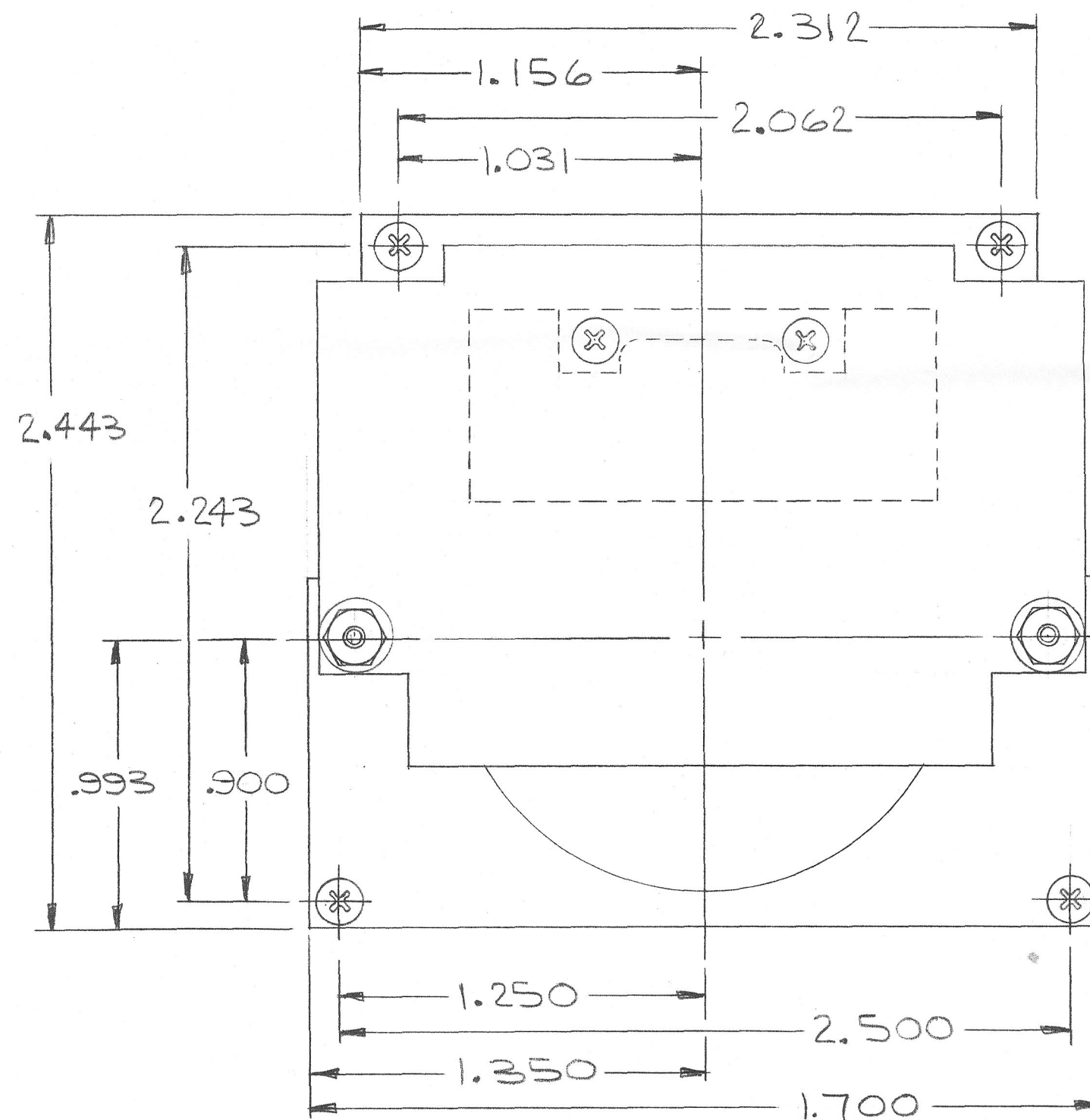
3

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2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS

1

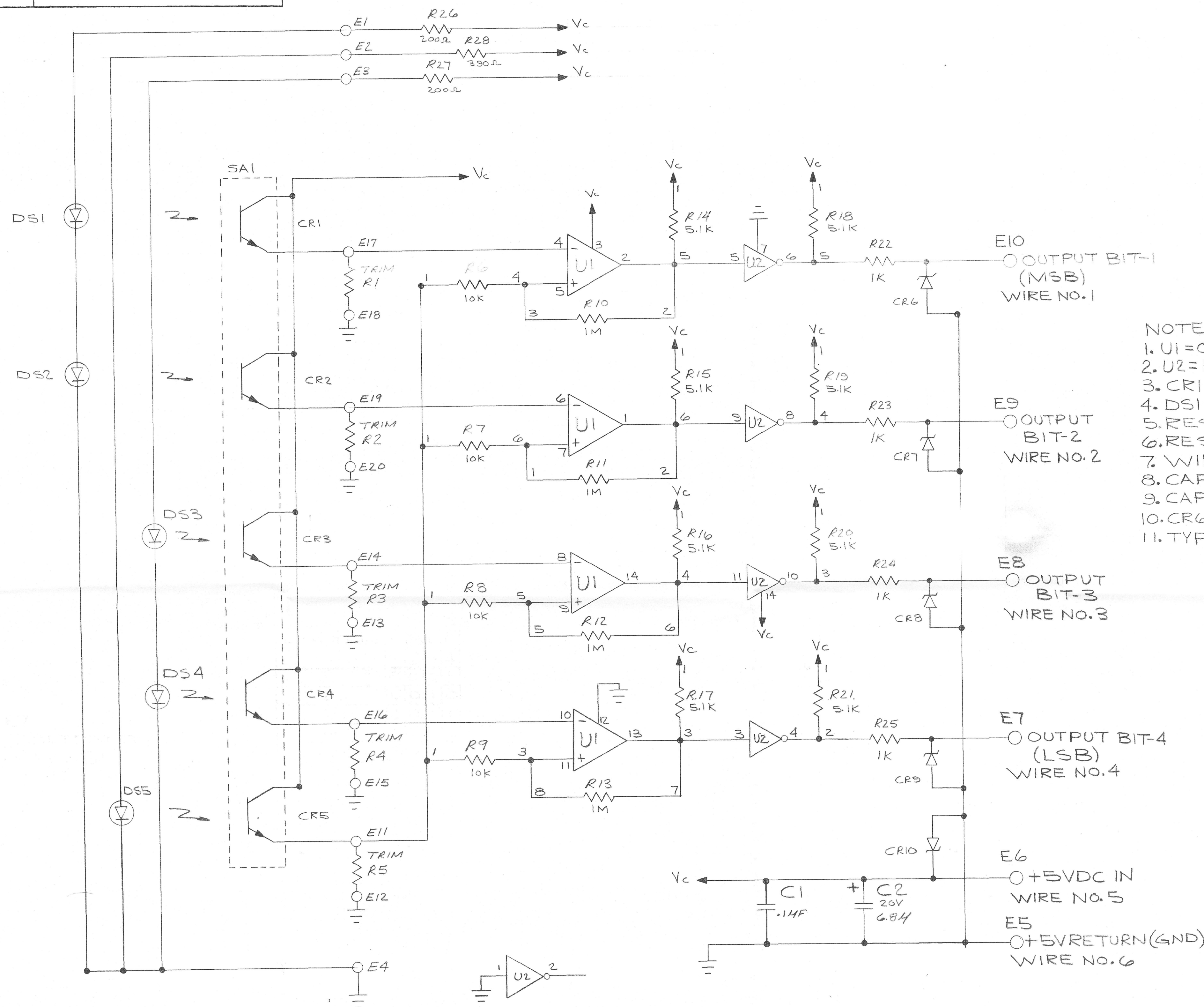


ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.		
LIST OF MATERIALS OR PARTS LIST									
UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED	NAME	DATE	SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.				
MACHINED SURFACE FINISH TO BE 63 R.M.S.		DIMENSIONS ARE IN INCHES	APPROVED PROD. ENG.		ENCODER OUTLINE				
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON	APPROVED DES. ENG.		SXI AEROFLEX				
ALL FILLET RADII TO BE _____ R		FRACTIONS ± 1/64	PROJECT ENG'R	1-26-94					
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		DECIMAL DIMENSIONS XX — ± .010 XXX — ± .005	CHECKED						
ALL CORNER RADII TO BE _____ R		ANGLES ± 30'	DRAWN	JOSEVERE 1-26-94					
AS APPLICABLE WITHIN _____ F.I.R.		MATERIAL:	APPROVAL (DESIGN ACTIVITY)		CODE IDENT. NO.	SIZE	DWG. NO.		
SURFACES MUST BE CONCENTRIC		NEXT ASSY			16858	C	19868-21781		
SURFACES MUST BE FLAT & STRAIGHT		USED ON			SCALE 2X1	SHEET 1 OF 1			
SURFACES MUST BE SQUARE		APPLICATION							
SURFACES MUST BE ROUND		NO. REQ. PER UNIT							
SURFACES MUST BE PARALLEL		STOCK NO.							
DESIGN IS SYMMETRICAL		TREATMENT AND/OR FINISH							

NOTICE—WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THEREOF.

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN # 10045	11-3-73	DL
B	ECN # 10073	1-6-79	DL
C	ECN # 10083	2-12-74	DL
D	ECN # 10232	12-12-76	DL



- NOTES: UNLESS OTHERWISE SPECIFIED.
1. U1=QUAD COMPARATOR - LM139J, M38510/11201-BCA ("or" B).
 2. U2=HEX INVERTER - SN5406J, M38510/00801-BCA ("or" B).
 3. CR1-CR5=LED - OP224 - 565305-1.
 4. DS1-DS5=PHOTOTRANSISTOR - OP604 - 565304-1.
 5. RESISTORS - RC05GXXXJR.
 6. RESISTORS - R26, R27, R28 - RC07GXXXJR.
 7. WIRE - M22759/32, #26AWG.
 8. CAPACITOR - C1 - CK06BX104KR.
 9. CAPACITOR - C2 - 6.8µF, 20V, 10%-39003/2C-2040 (LEVEL B=0.1%).
 10. CR6-CR10 = JANSIN4464, 9.1V.
 11. TYPICAL VALUE FOR R1-R5, 500Ω TO 2000Ω.

TABLE-1

POSITION	BIT			
	1	2	3	4
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	1	1	0	0
...
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0

ARX P/N 531-54
SCHEMATIC, ENCODER

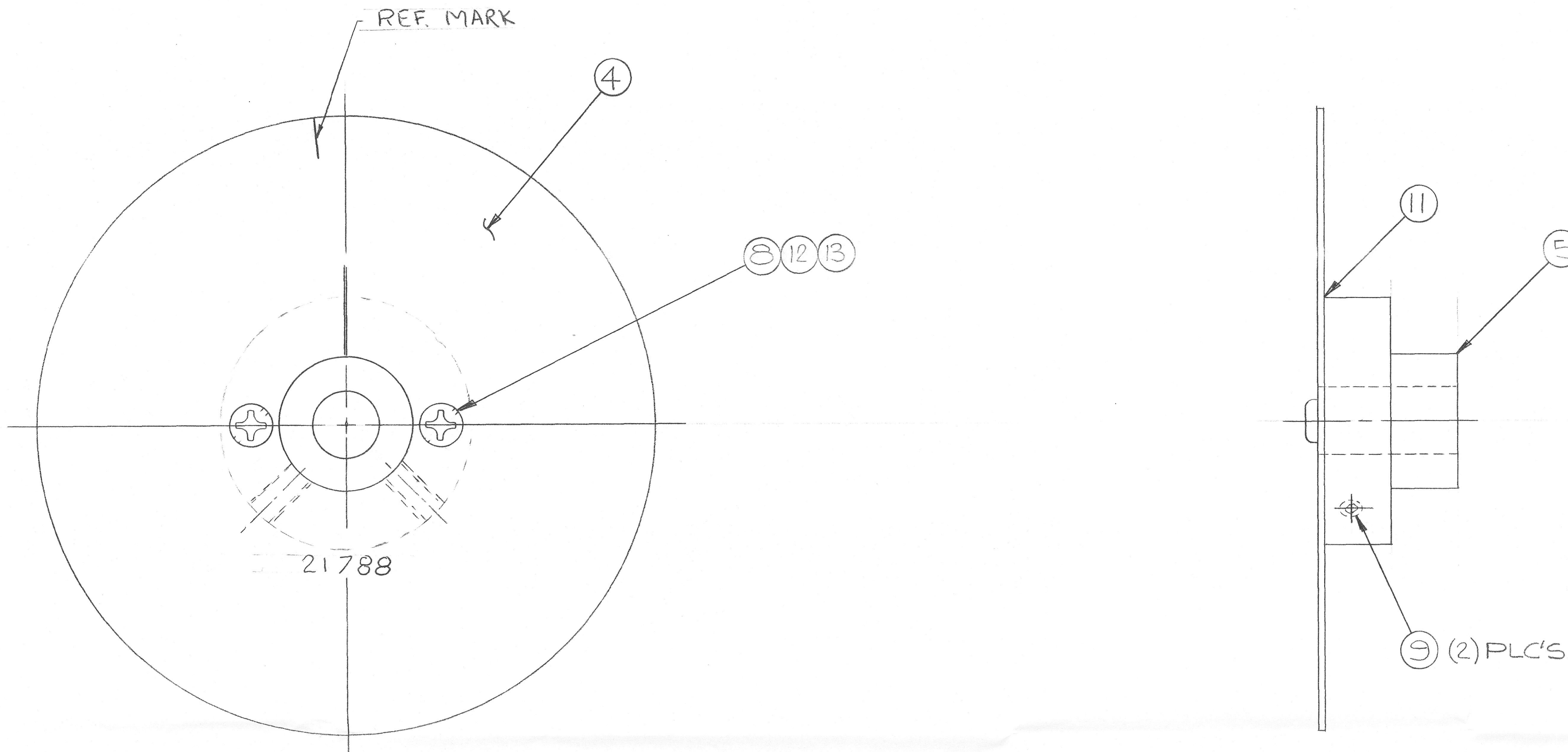
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED				NAME	DATE	SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.	
MACHINED SURFACE FINISH TO BE 63 R.M.S.				APPROVED PROD. ENG.		SCHEMATIC SXI STEPPER MOTOR ENCODER AEROFLEX	
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.				APPROVED DES. ENG.			
ALL FILLET RADII TO BE .005 R				PROJECT ENGR	10-12-73		
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.				CHECKED			
ALL CORNER RADII TO BE .005 R				DRAWN	JOSE VERA 10-11-73	CODE IDENT. NO. 16858	
AS APPLICABLE WITHIN F.I.R.				APPROVAL (DESIGN ACTIVITY)		SIZE D	DWG. NO. 19868-21667
SURFACES MUST BE CONCENTRIC				OTHER APPROVAL		SCALE NONE	SHEET 1 OF 1
SURFACES MUST BE FLAT & STRAIGHT							
SURFACES MUST BE SQUARE							
SURFACES MUST BE PARALLEL							

UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED	
MACHINED SURFACE FINISH TO BE 63 R.M.S.		DIMENSIONS ARE IN INCHES	
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON	
ALL FILLET RADII TO BE .005 R		FRACTIONS	DECIMAL DIMENSIONS
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		± 1/64	.XX - ± .010 .XXX - ± .005
ALL CORNER RADII TO BE .005 R		ANGLES	± 30'
AS APPLICABLE WITHIN F.I.R.		MATERIAL:	
SURFACES MUST BE CONCENTRIC		WAT. SPEC.	
SURFACES MUST BE FLAT & STRAIGHT		TREATMENT AND/OR FINISH	
SURFACES MUST BE SQUARE			
SURFACES MUST BE PARALLEL			

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INC. IS NOT GRANTED

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN # 10085	2-27-94	JH
B	ECN # 10180	3-21-94	JH



NOTES: UNLESS OTHERWISE SPECIFIED

- INTERPRET THIS DRAWING IAW DOD-STD-100C
- CEMENT ITEM 4 (DISC) TO ITEM 5 (HUB) WITH ITEM 11 (ADHESIVE, EPOXY),
ADD ITEM 8 (SCREW PAN HEAD) AND TIGHTENER?
a) MIX (7) PARTS OF "A" WITH (3) PARTS OF "B" (BY WT. OR VOL.)
b) CURE ASSY. FOR 30 MIN. @ 90°C.
- THREAD LOCK ITEM 8 (SCREW PAN HEAD) WITH ITEM 12 (2850 FT) AND ITEM 13 (CAT 9).
a) MIX 100 PARTS OF ITEM 12 (2850 FT) WITH 3-4 PARTS OF ITEM 13 (CAT 9) BY WT.
b) CURE AT 65°C FOR 1-2 HRS.

13	AR	CATALYST 9				EMERSON & CUMING, INC
12	AR	STYCAST	(BLK)	2850 FT		EMERSON & CUMING, INC
11	AR	ADHESIVE, EPOXY		A271		ARMSTRONG
10						
9	2	SCREW Soc. Hd. SET		2-56 X 1/4 LG	CRES	MSS1021-3
8	2	SCREW-PAN HEAD		0-80 X 3/16 LG	CRES	MSS1958-121
7						
6						
5	1	HUB		19868-21680		
4	1	DISC		19868-21788		
3						
2						
1	X	DISC/HUB ASSY		19868-21766-1		
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION
						TREATMENT OR FINISH AND SPEC.

UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.			
MACHINED SURFACE FINISH TO BE $\sqrt{32}$ R.M.S.		DIMENSIONS ARE IN INCHES		APPROVED PROD. ENG.				DISC AND HUB ASSY. SXI AEROFLEX			
MACHINED FILLET RADI TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON		APPROVED DES. ENG.							
ALL FILLET RADI TO BE _____ R		FRACTIONS		DECIMAL DIMENSIONS		ANGLES		PROJECT ENG'R		JH	
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		$\pm 1/64$		$.XX - \pm .010$ $.XXX - \pm .005$		$\pm 30'$		CHECKED			
ALL CORNER RADI TO BE _____ R		MATERIAL:		MAT. SPEC.		DRAWN		JOSE VERE		1-19-94	
AS APPLICABLE WITHIN _____ F.I.R.		NEXT ASSY		USED ON		APPROVAL (DESIGN ACTIVITY)					
SURFACES MUST BE CONCENTRIC		SURFACES MUST BE FLAT & STRAIGHT		APPLICATION		TREATMENT AND/OR FINISH					
SURFACES MUST BE SQUARE		SURFACES MUST BE ROUND		NO. REQ. PER UNIT		OTHER APPROVAL					
SURFACES MUST BE PARALLEL		DESIGN IS SYMMETRICAL		STOCK NO.							
								CODE IDENT. NO.		SIZE	
								16858		D	
								19868-21766		B	
								SCALE 4X1		SHEET 1 OF 1	

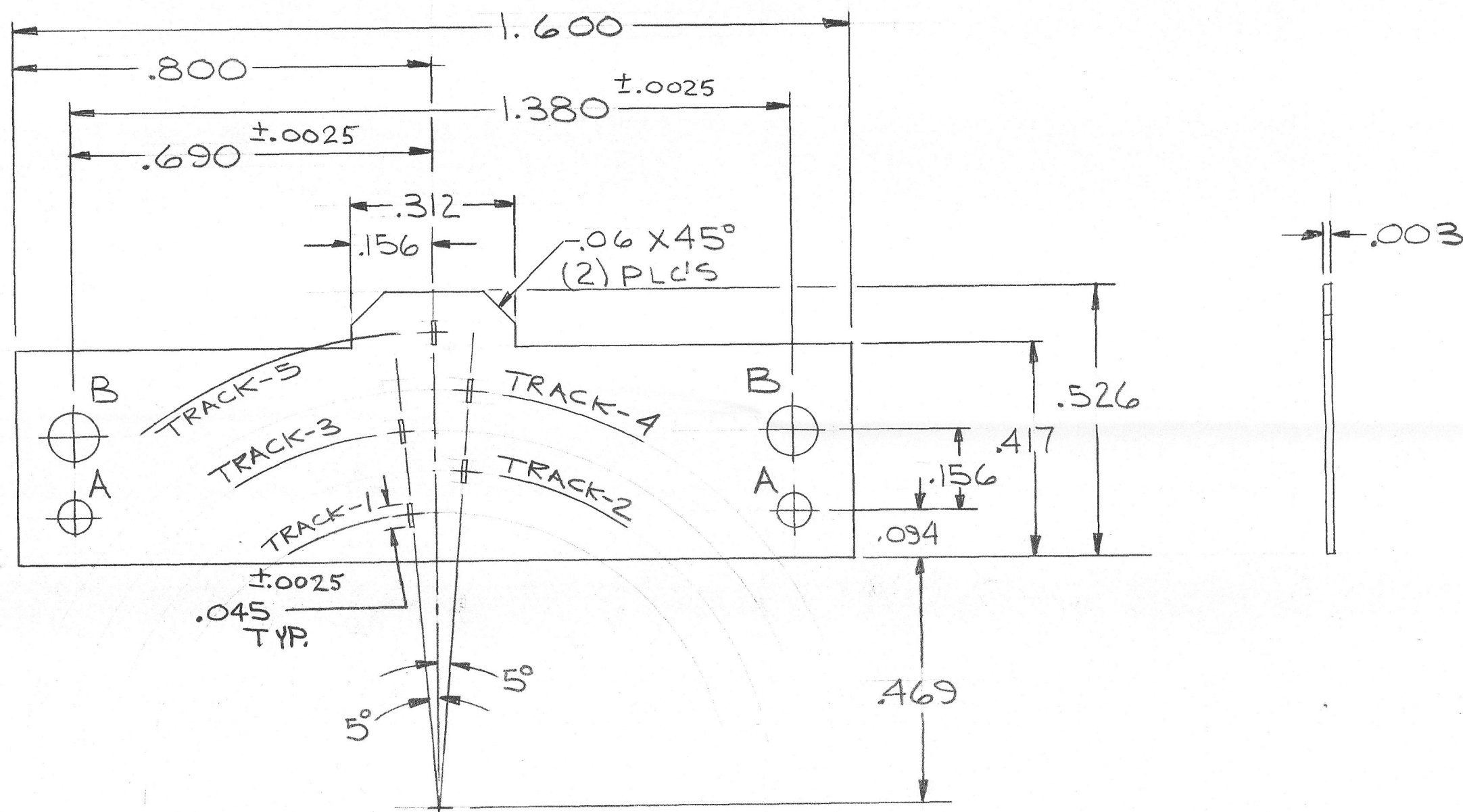
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVALS
A	ECN NO. 10034	10-19-93	HL
B	ECN NO. 10075 (RE DRAWN)	1-12-94	HL
C	ECN NO. 10085	2-27-94	HL
D	ECN NO. 10094	3-11-94	HL



TRACK NO.	TRACK RAD.	SLIT WIDTH ±.001
1	.5625	.006
2	.643	.006
3	.723	.006
4	.803	.006
5	.9155	.006

HOLE LEGEND

SYM	DESCRIPTION	QTY
A	.063 ±.005 DIA. THRU	2
B	.094 DIA THRU	2

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING IAW DOD-STD-100C AND ANSI Y14.5M 1982.
2. MATERIAL: .003 THK. BE CU #25 1/2 HT, UNS NO. C17200.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005R MAX.
4. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQT 9 AND THIS DWG.
5. SURFACE FINISH SHALL BE 125/ OR BETTER ALL OVER.
6. USE WITH DISC NO. 19868-21788.

ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED				NAME		DATE	
MACHINED SURFACE FINISH TO BE $\sqrt{125}$ R.M.S.				APPROVED PROD. ENG.			
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.				APPROVED DES. ENG.			
ALL FILLET RADII TO BE _____ R				PROJECT ENGR		HL 10-7-93	
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.				CHECKED			
ALL CORNER RADII TO BE _____ R				DRAWN		JOSE VERE 10-7-93	
AS APPLICABLE WITHIN _____ F.I.R.				APPROVAL (DESIGN ACTIVITY)			
19868-21763				OTHER APPROVAL			
NEXT ASSY USED ON				CODE IDENT. NO.		SIZE DWG. NO.	
APPLICATION				16858		C 19868-21787	
NO. REQ. PER UNIT				SCALE 4X1		SHEET 1 OF 1	
STOCK NO.							
TREATMENT AND/OR FINISH							
UNLESS OTHERWISE SPECIFIED				NAME		DATE	
DIMENSIONS ARE IN INCHES				APPROVED PROD. ENG.			
TOLERANCES ON				APPROVED DES. ENG.			
FRACTIONS DECIMAL DIMENSIONS ANGLES				PROJECT ENGR		HL 10-7-93	
± 1/64 XX - ± .010 XXX - ± .005 ± 30'				CHECKED			
MATERIAL:				DRAWN		JOSE VERE 10-7-93	
NOTE 2				APPROVAL (DESIGN ACTIVITY)			
MAT. SPEC.				OTHER APPROVAL			
TREATMENT AND/OR FINISH							

SEQUENTIAL ELECTRONIC SYSTEMS, INC.
ELMSFORD, N.Y.

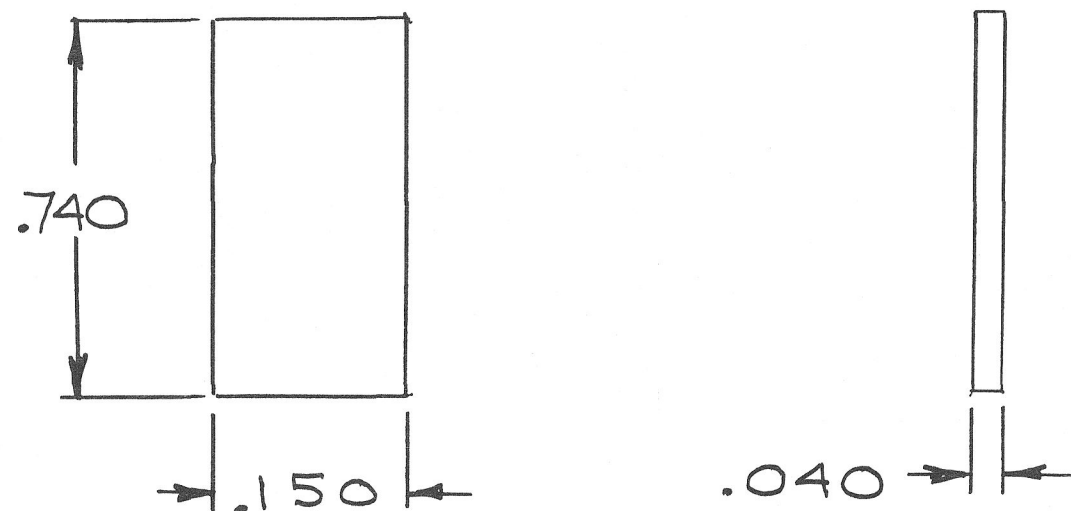
RETICLE
SXI AEROFLEX

CODE IDENT. NO. 16858
SIZE C
DWG. NO. 19868-21787
REV D

TRACK NO	DIA. ±.0025	SLOT WIDTH ±.0025	NO. OF SLOTS
1	1.125	.074	5
2	1.286	.084	5
3	1.446	.095	6
4	1.606	.105	6

ITEM	QTY REQ	NONENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.
LIST OF MATERIALS OR PARTS LIST							
UNLESS OTHERWISE SPECIFIED			NAME		DATE		
DIMENSIONS ARE IN INCHES TOLERANCES ON			APPROVED PROD. ENG.		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.		
FRACTIONS	DECIMAL DIMENSIONS	ANGLES	APPROVED DES. ENG.		DISC SXI AEROFLEX		
± 1/64	.XX — .010 .XXX — .005	± 15'	PROJECT ENGR				
MATERIAL:			CHECKED				
NOTE 2			DRAWN	JOSEVERE 10-7-93			
MAT. SPEC.			APPROVAL (DESIGN ACTIVITY)		CODE IDENT. NO.	SIZE	DWG. NO.
TREATMENT AND/OR FINISH			OTHER APPROVAL		16858	D	19868-21788
					SCALE	4x1	SHEET OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN # 10179	8-31-94	JH



- NOTES: UNLESS OTHERWISE SPECIFIED:
1. INTERPRET THIS DWG. IAW MIL-STD-100E AND ANSI Y14.5M 1982.
 2. MATERIAL: PURE TANTALUM
 3. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005R MAX.
 4. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ T 9. AND THIS DWG.
 5. SANDBLAST ALL SURFACES.

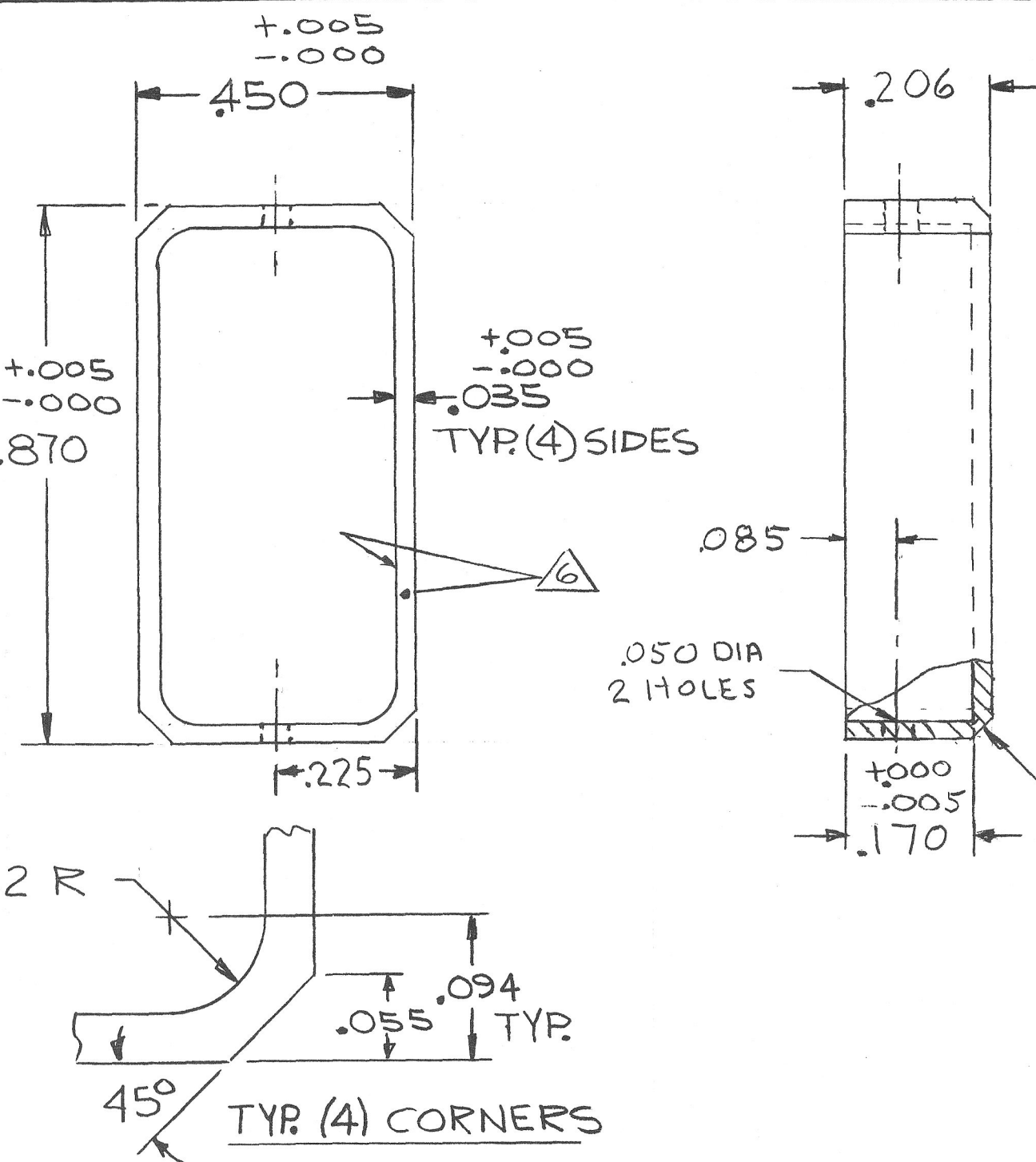
UNLESS OTHERWISE SPECIFIED
MACHINED SURFACE FINISH TO BE $\sqrt{R} M S$
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE ALL FILLET RADII TO BE _____ R
REMOVE BURRS AND SHARP CORNERS .003 - .010 FROM MACHINED SURFACES. ALL CORNER RADII TO BE _____ R

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- AS APPLICABLE WITHIN _____ F. I. R.
- ⊙ SURFACES MUST BE CONCENTRIC
 - ⊥ SURFACES MUST BE SQUARE
 - || SURFACES MUST BE PARALLEL
 - SURFACES MUST BE FLAT & STRAIGHT
 - SURFACES MUST BE ROUND
 - ≡ DESIGN IS SYMMETRICAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		
FRACTIONS	DECIMAL DIMENSIONS	ANGLES
$\pm \frac{1}{64}$.XX - $\pm .010$.XXX - $\pm .005$	$\pm 30'$
MATERIAL PER NOTE 2 TREATMENT AND/OR FINISH PER NOTES 5		
MAT. SPEC.		

NAME		DATE	SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.	
APPROVED PROD. ENG.				
APPROVED DES. ENG.				
PROJECT ENG'R			SHIELDING INT. CKT SXI AEROFEX	
CHECKED	JH	5-13-94		
DRAWN	JOSE VERE	5-11-94		
APPLICATION				
NEXT ASSY	USED ON	CODE IDENT NO	SIZE	DWG. NO.
		16858	B	19868-21796
NO. REQ. PER UNIT		SCALE 4X1	SHEET 1 OF 1	
			REV A	



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
A	ECN # 10179	8-31-94	JH

NOTES: UNLESS OTHERWISE SPECIFIED:

1. INTERPRET THIS DWG. IAW MIL-STD-100E AND ANSI Y14.5M 1982.
2. MATERIAL: PURE TANTALUM
3. REMOVE ALL BURRS AND BREAK SHARP EDGES, .005R MAX.
4. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ 9. AND THIS DWG.
5. SANDBLAST ALL SURFACES.
6. COAT SURFACES INDICATED WITH STYCAST 2651 PER ARX 5-125-0.

.030 X 45° CHAMFER
TYP. ALL AROUND

TYP. (4) CORNERS

DETAIL-A

SCALE: 10X1

UNLESS OTHERWISE SPECIFIED
MACHINED SURFACE FINISH TO BE $\sqrt{32}$ RMS
MACHINED FILLET RADIUS TO HAVE SAME FINISH AS ADJACENT
SURFACE ALL FILLET RADIUS TO BE _____ R
REMOVE BURRS AND SHARP CORNERS .005 - .010 FROM
MACHINED SURFACES ALL CORNER RADIUS TO BE _____ R

AS APPLICABLE WITHIN
F.I.R.

⊙ SURFACES MUST BE
CONCENTRIC

⊥ SURFACES MUST BE
SQUARE

|| SURFACES MUST BE
PARALLEL

— SURFACES MUST BE
FLAT & STRAIGHT

○ SURFACES MUST BE
ROUND

≡ DESIGN IS
SYMMETRICAL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMAL DIMENSIONS	ANGLES
$\pm \frac{1}{64}$.XX - $\pm .010$ XXX - $\pm .005$	$\pm 30^\circ$

MATERIAL
PER NOTE 2
TREATMENT AND/OR FINISH
PER NOTES 5 & 6

MAT SPEC

	NAME	DATE
APPROVED PROD ENG		
APPROVED DES ENG		
PROJECT ENGR		
CHECKED	JH	5-13-94
DRAWN	JOSE VERE	5-11-94

APPLICATION

NEXT ASSY	USED ON

NO. REQ. PER UNIT

SEQUENTIAL ELECTRONIC SYSTEMS, INC.
ELMSFORD, N.Y.

SHIELDING INT. CKT
SXI AEROFEX

CODE IDENT NO	SIZE	DWG. NO.	REV
16858	B	19868-21819	A

SCALE 4X1

SHEET 1 OF 1

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVALS
B	ECN#10128	6/2/94	<i>[Signature]</i>
C	ECN#10215	10/24/94	<i>[Signature]</i>
D	REVISED-Added item 17 Per APPR ECN 11869	11/30/94	<i>[Signature]</i>

20								
19								
18								
17	AR	EPOXY INK - BLACK		MIL-I-43553	TYPE 1			
16								
15	AR	CAT 9			SEE NOTE 6			
14	AR	STYCAST		2651	SEE NOTE 6			
13								
12								
11								
10	5	LEDS		565305-1		OPTEK	DSI-DS5	
9								
8	A/R	WIRE, ELECTRICAL		M22759/18-269				
7								
6	1	SHIELDING LEDS		19868-21761-1				
5	1	FAB & DRILL PCBD		19868-21775				
4								
3								
2								
1	X	PWB ASSY (LED BD)		19868-21774-1				
ITEM	QTY REQ	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART NO. OR IDENTIFYING NO.	MATERIAL OR NOTE	SPECIFICATION	TREATMENT OR FINISH AND SPEC.	

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED		NAME		DATE		SEQUENTIAL ELECTRONIC SYSTEMS, INC. ELMSFORD, N.Y.			
MACHINED SURFACE FINISH TO BE ∇ R.M.S.		DIMENSIONS ARE IN INCHES		APPROVED PROD. ENG.				PWB ASSEMBLY LED BOARD			
MACHINED FILLET RADII TO HAVE SAME FINISH AS ADJACENT SURFACE.		TOLERANCES ON		APPROVED DES. ENG.							
ALL FILLET RADII TO BE _____ R		FRACTIONS DECIMAL DIMENSIONS ANGLES		PROJECT ENG'R		6-2-94					
REMOVE BURRS AND SHARP CORNERS .005-.010 FROM MACHINED SURFACES.		$\pm 1/64$ XX $\pm .010$ XXX $\pm .005$		CHECKED							
ALL CORNER RADII TO BE _____ R		MATERIAL:		DRAWN		JOSE VERE 6/2/94					
AS APPLICABLE WITHIN _____ F.I.R.		MATERIAL SPEC.		APPROVAL (DESIGN ACTIVITY)				CODE IDENT. NO. SIZE DWG. NO. REV			
SURFACES MUST BE CONCENTRIC		TREATMENT AND/OR FINISH		OTHER APPROVAL				16858 C 19868-21774 D			
SURFACES MUST BE SQUARE								SCALE \approx SHEET 2 OF 2			
SURFACES MUST BE PARALLEL											
SURFACES MUST BE FLAT & STRAIGHT											
SURFACES MUST BE ROUND											
DESIGN IS SYMMETRICAL											
NEXT ASSY		USED ON									
APPLICATION											
NO. REQ. PER UNIT											
STOCK NO.											

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	2850 WAS 2851 PER ECN TP-017	10/16/74	WZ

1. Clean surfaces to be bonded by vapor degreasing in freon or solvent wiping with MEK where degreasing is impractical.
2. Mix the resin to a uniform consistency before weighing.
3. Weigh out 100 parts of Stycast 2850 Ft. Add 3.5±0.5 parts by weight of Catalyst 9. Blend thoroughly.
4. Apply to areas to be bonded per print. Wipe up spills or excess with MEK.
5. Cure 12 hours at 70°F or oven cure for 2 hours at 150°F.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON FRAC. DEC. ANGLES	7 MAY 73		AEROFLEX LABORATORIES INCORPORATED SOUTH SERVICE ROAD PLAINVIEW, LONG ISLAND, NEW YORK		
	DRAWING STARTED	DATE			
	DRAWN A. GARRETT		BONDING PROCEDURE Stycast 2850 FT Catalyst 9		
	CHECKED				
	ENGR <i>[Signature]</i>				
MATERIAL:	Q.A. to 4/10/74		SIZE	CODE IDENT NO.	
FINISH:	MFG <i>[Signature]</i> 4/20/68		A	88379	5-068-0
			SCALE		SHEET 1 of 1

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROV
		A	1. Par 5 was Vacuum impregnation 2. Added Note 8	5/18/73	MCR H. P. A 4/8/74
		B	MATERIAL WAS 281	2-25-76	MCR
		C	ADDED "FREON TMC ECU 10166	4/8/81	D. K. W. S.
		D	CHANGED "FREON" TO IPA (11890)	9/14/84	I. H. C. H.

IMPREGNATION

1. Clean part to remove oil, grease and foreign material ~~using~~ IPA PER 5-3
2. Dry part by heating for 1 hour minimum at $120^{\circ} \pm 15^{\circ}\text{C}$.
Cool to 100°C before impregnating.
3. Thoroughly mix each part of the impregnant in their container before use.
Weigh out 20 parts by weight of part A to 30 parts by weight of part B.
Mix thoroughly.
4. Degas mixture at a vacuum of 5-10 mm. Hg for 5 to 15 minutes.
5. Paint degassed mixture onto windings until no more impregnant will be absorbed by windings.
6. Place in 150°F oven in a horizontal position. Examine every 10-15 minutes and wipe excess with lint free wiper (Kimwipes or equivalent) as the part drains. Turn unit over and repeat 10-15 minute drain cycles until excess has been removed and runoff has ceased.
7. Cure for 20 hours at $75^{\circ} \pm 5^{\circ}\text{C}$.
8. Repeat step 5, 6 and 7.

For use as Thixotropic Coating or Fill

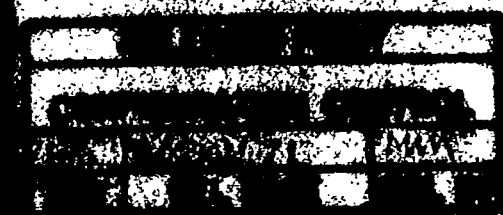
1. Mix resin as per Para 3
2. Add Cab-0-Sil M-5, 5-8% parts by weight of total resin weight.
3. Coat or fill per detail drawing.
4. Cure for 20 hours as $75^{\circ} \pm 5^{\circ}\text{C}$.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON FRAC. DEC. ANGLES	DRAWING STARTED DATE 4/3/73 A. GARRETT		AEROFLEX LABORATORIES INCORPORATED SOUTH SERVICE ROAD PLAINVIEW, LONG ISLAND, NEW YORK	
	DRAWN		(B) SCOTCHCAST 280/281 IMPREGNATION Scotchcast 280/281 A/B (3M Company)	
MATERIAL:	CHECKED			
	ENGR M. Dardeman		A	88379
FINISH:	H. P. A 4/8/74 MFG H. W. S. 9/14/88		5-071-0	
			SCALE	SHEET 1 of 1

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		✓	INITIAL REC RE 518	9/9/82	<i>[Signature]</i>
		✓			

Bond parts as follows:

- A. All surfaces to be bonded shall be free of grease or other possible contaminants at time of bonding.
- B. Bonding mixture to be mixed and used is proportioned by weight, as follows:
 1. Mix the resin in the shipping container until it is uniform in texture. This will normally require 2 - 5 minutes in 1 to 5 gallon containers.
 2. Add 1.75 grams of Catalyst #9 to 25 grams of Stycast 2651 and stir thoroughly. Pot life is about 1/2 hr. keep Catalyst #9 away from contact with the skin.
- C. Apply bonding mixture to areas to be cemented.
- D. Cure at 160 to 170°F for 1 hour. (Optional: cure at room temperature for 8 hours).



DRAWING STARTED <i>[Signature]</i> 9/1/82		AEROFLEX LABORATORIES INCORPORATED SOUTH SERVICE ROAD PLAINVIEW, LONG ISLAND, NEW YORK	
GENERAL BONDING PROCEDURE STYCAST 2651 (Emerson & Cuming, Canton Mass.)			
SIZE A	CODE IDENT NO. 88379	5-125-0	
SCALE 1/4" = 1"			

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL REL. RC 532	11-9-82	<i>AMF</i>
		B	REVISED FOR ECN 10601	2-21-84	<i>AMF</i>

1.0 TITLE

Intermediate Cleaning Procedure, Stator Core

2.0 PURPOSE

To establish a uniform procedure to control the cleaning processes of a stator core.

3.0 EQUIPMENT/MATERIAL

Cloroethane-Nu

Bottle Brush

Dry Filtered Air

Container to hold Cloroethane Nu

4.0 PROCEDURE

The following procedure shall be followed:

- 4.1 Place stator core into bath of Cloroethane-Nu. While stator core is submersed, pass bottle brush thru I.D. several times, then brush the O.D.
- 4.2 Remove stator from bath and blow off with dry filtered air.
- 4.3 Unit is now cleaned and ready for the next manufacturing sequence.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE ON
FRAC. DEC. ANGLES

DRAWING STARTED DATE

DRAWN

CHECKED

ENGR

MEG

QA



AEROFLEX LABORATORIES INC.

SOUTH SERVICE ROAD • PLAINVIEW, LONG ISLAND, NY 11803

INTERMEDIATE CLEANING PROCEDURE, STATOR CORE

SIZE

A

CODE IDENT NO.

88379

5-128-0

SCALE

SHEET 1 of 1

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL ROL-12532	11-4-82	<i>[Signature]</i>
		B	REVISION FOR GEN 10601	8-21-84	<i>[Signature]</i>

1.0 TITLE

Cleaning Procedure - Motor Coils

2.0 PURPOSE

To establish a uniform procedure to control the cleaning process of motor coils prior to stator inspection.

3.0 EQUIPMENT/MATERIAL

Cloroethane Nu

Container to hold Cloroethane Nu


4.0 PROCEDURE

The following procedure shall be followed:

4.1 Place coil winding into bath of Cloroethane-Nu.

4.2 After submersing the coil windings, remove and air dry 5 min. prior to insertion into stator.

4.3 Coils are now cleaned and ready for the next manufacturing sequence.

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	DRAWN _____				
	MATERIAL	CHECKED <i>[Signature]</i> 11/5/82	CLEANING PROCEDURE: MOTOR COILS		
		ENGR <i>[Signature]</i> 11/5/82			
FINISH	MAF <i>[Signature]</i> 11/5/82	SIZE A	FSCM NO. 88379	5-130-0	
	QA <i>[Signature]</i> 11/8/82	SCALE _____	WEIGHT _____	SHEET 1 of 1	

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	API
		A	INITIAL REC. RC 532	11-4-82	A

1.0 TITLE

Cleaning Procedure, Shaft & Rotor Assembly

2.0 PURPOSE

To establish a uniform procedure to control the cleaning process of shaft and rotor assemblies.

3.0 EQUIPMENT/MATERIAL

Cloroethane Nu

Container to hold Cloroethane-Nu

Brush

Scotch Tape

Dry Filtered Air

4.0 PROCEDURE


The following procedure shall be followed.

4.1 Place shaft and rotor assembly into bath of Cloroethane-Nu. While the assembly is submersed, pass brush over entire assembly several times.

4.2 Remove the assembly from bath and blow off with dry filtered air.

4.3 When applicable, remove any chips from the magnets using Scotch Tape and reclean in clean Cloroethane-Nu.

4.4 Unit is now cleaned and ready for next manufacturing sequence.

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	DRAWN			
MATERIAL	CHECKED	<i>[Signature]</i> 11-8-82	CLEANING PROCEDURE, SHAFT & I	
	DATE	11-4-82		
FINISH	DATE	11-8-82	SIZE	FSCM NO.
	DATE	11/8/82	A	88379
	SCALE	WEIGHT	SHEET	

APPLICATION			REVISIONS					
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		A	NEW DWG RC-1244		9-1-87	D. Kerstein		

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MATERIAL	QA <i>C. Williams 9/1/87</i> MFG <i>Kerstein 9/1/87</i>	FLUIDIZED BED COATING PROCEDURE FOR SCOTCHCAST ELECTRICAL RESIN #5230																																	
FINISH	SCALE WEIGHT SHEET 1 OF 3	SIZE A FSCM NO. 88379 5-222-0																																	

Procedure 5-222-0

FLUIDIZED BED COATING PROCEDURE FOR
SCOTCHCAST ELECTRICAL RESIN #5230

- 1.0 SCOPE: This procedure is a compilation of coating methods which requires the use of different oven temperatures, and tooling that allows the parts to be reversed in the direction of entry into bed coat tank.
- 2.0 CLEANING AND PREPARATION: Assemblies to be coated must be free of dirt, grease, mold release, and other sources of contamination. Surfaces to be coated should not be touched after cleaning without the use of clean gloves.
- 2.1 Spray coat fluidizing tools with MILLER-STEPHENSON MS-122 fluorocarbon release agent.
- 2.2 Remove any epoxy showing on the lamination surfaces with 220 grit emery paper, and then clean by rinsing in Clorathane-Nu or Freon TF.
- 2.3 Prior to placing parts in the oven, mask outside diameter or indicated areas of assembly that are not going to be coated.
- 3.0 HEATING: Oven must be preset to 280°F minimum as a starting point. Actual temperature may vary depending on size, surface area to be coated, and thickness desired.
- 3.1 Place parts in the oven and allow them to reach oven temperature. Actual time will depend on mass of part and desired coating thickness.
- 4.0 COATING AND CURING: While parts are preheating, don the respirator mask and turn on exhaust fan and fluidizing bed in that order. Mask must be worn as long as fluidizer is on.
- 4.1 Turn on vibrator mechanism on fluidizer by rotating one revolution CCW.
- 4.2 Turn on air supply by rotating air control CW 3 to 5 turns.
- 4.3 Stir epoxy powder gently to loosen caked powder.
- 4.4 After a few minutes, air jets should appear on the surface of the powder. Adjust air and vibration until the powder has the appearance of a smooth undulating fluid.
- 4.5 Remove the part to be coated from the oven, and immerse in the fluidizing tank. Agitate the part vigorously for the length of time required to build up the specific coating thickness.
- 4.6 Only when specified, vigorously tap the end of holding fixture against the spray booth surface to shake off excess powder from the slots. Reverse hold on the unit, dip again from the other side and remove excess powder from slots by tapping as before.

SIZE A	FSCM NO. 88379	5-222-0	
SCALE		REV.	SHEET 2 OF 3

- 4.7 Where applicable, remove masking and ID masking plug from slotted core.
- 4.8 Place coated units into preheated oven at 275°F for 1/2 hour to allow material to jell.
- 4.9 After 1/2 hour has elapsed and material has jelled, increase oven temperature to 400°F for 1/2 hour for final cure.
- 4.10 Remove parts from oven and allow them to cool to room temperature.
- 4.11 Visually inspect parts for defects.
- 5.0 STRIPPING: If required, use MEK to soak off coating on stack. This may also require some mechanical cutting.
- 6.0 MAINTENANCE OF FLUIDIZER: During this operation, a face mask must be worn.
- 6.1 Once a month, remove all powder from tank and discard. Remove tank and clean same.
- 6.2 Remove desiccant bag and dry overnight in a 250°F oven.
- 6.3 Re-assemble, and replace powder.
- 6.4 Test for proper operation.

SIZE A	FSCM NO. 88379	5-222-0	
SCALE		REV.	SHEET 3 OF 3

1.0 SCOPE

This specification defines the criteria used to accept rotor magnets used in all space applications.

2.0 INSPECTION CRITERIA

100% visual inspection as follows:

- 2.1 Exposed rotor pole surfaces, after machining, must meet the following requirements:
- 2.2 All magnet surfaces shall be free from foreign materials which would hold or collect extraneous particles on the magnet surface.
- 2.3 Magnets shall be free of loose chips and burrs, and free from imperfections which would result in loose chips or particles under normal conditions of handling, shipping, or use of the magnet. A chipped edge or surface shall be acceptable if not more than 10% of the edge or 5% of the surface is removed, provided that no loose particles remain on the edge or surface, and that the magnet under examination meets the magnetic requirements.
- 2.4 Other imperfections, such as minor hairline cracks, porosity, or voids of the type commonly found in sintered magnetic products, are acceptable if 1) the magnet meets the minimum magnetic performance requirements, 2) the imperfections will not create loose particles or other conditions which would interfere with proper functioning of the end device, and (3) visual imperfections do not extend linearly across more than 25% of any pole surface. Any hairline crack shall not extend more than 25% of the edge to edge distance along the best straight line through the crack.
- 2.5 A magnet is considered acceptable if it meets all the requirements of 2.2, 2.3 and 2.4.

SIZE A	FSCM NO. 88379	5-258-0	
SCALE	REV. B	SHEET 2 052	

1.0 TITLE

General cleaning procedure for metal machined parts

2.0 PURPOSE

This procedure can be used when cleaning prior to bonding, coating, or other indicated assembly operations.

3.0 EQUIPMENT AND MATERIALS

Chloroethane-Nu (Electronics grade, stabilized, 1-1-1-Trichloroethane)

Bottle brush (nylon bristles or similar material)

Dry Filtered Air

Glass or polypropylene container rinsed with Chloroethane-Nu.

Rubber (Neoprene) gloves

Safety goggles


4.0 PROCEDURE

4.1 Place metal part (except magnesium, titanium and alloys) into a container with enough Chloroethane-Nu to cover the part. All work shall be done under a fume hood vented to the outside of the plant. Workers must wear safety goggles and rubber gloves. While the part is submerged, pass the brush through the I.D of the part (if applicable) several times and then brush all exposed surfaces.

4.2 Remove the part from the bath and blow off any excess liquid with dry filtered air. Place the part in a clean plastic container.

4.3 The part is now ready for the next assembly sequence.

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5-294-0																																				
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		DRAWN I. H. 1-2-94																																		
MATERIAL		CHECKED		SIZE A FSCM NO. 88379 5-294-0																																
		ENGNRG. P. H. 1/25/94																																		
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		QA C. P. 1/25/94																																		
		MFG M. K. 1/25/94																																		

1.0 TITLE

Procedure for bonding of temperature transducer to motor housing.

2.0 PURPOSE

This procedure describes the materials and processes used to bond and stake a temperature transducer to a motor housing for space applications.

3.0 EQUIPMENT AND MATERIALS

3.1 THERMISTOR BONDING

3.1.1 EQUIPMENT

- a. Mixing container: stainless steel , glass, polyethylene or polypropylene.
- b. Mixing spatula: metal, glass, or plastic.
- c. Balance: capable of weighing to +/-,1grams.
- d. Vacuum deaeration device capable of maintaining 29 in hg.

3.1.2 MATERIALS

- a. Conductive epoxy : Eccobond 285 / Catalyst 9 (Emerson and Cuming, Inc., Canton MA.)

3.2 THERMISTOR COATING

3.2.1 EQUIPMENT

Same as 3.1.1 ,with these additions:

- a. Applicators: clean and unlubricated syringes, spatulas, etc., of metal, glass, polyethylene or polypropylene.
- b. Oven: forced air, capable of maintaining temperatures between 50 and 85 degrees C.

3.2.2 MATERIALS

- a. Polyurethane compound: PR-1564, Parts A and B (Products Research and Chemical Corp., 21800 Burbank Blvd., Woodland Hills , CA 91367, 818-702-8900
- b. Silicon dioxide particles : Cab-O-Sil

SIZE A	FSCM NO. 88379	5-294-0	
SCALE		REV.	SHEET 2

3.3 PRECAUTIONS AND SAFETY INFORMATION

The isocyanate in uncured urethanes can cause serious allergic reaction (skin rash or breathing difficulty).

Mixed, uncured epoxies and curing agents are irritants and can harm body functions.

Avoid direct skin contact, ingestion, or breathing of vapors of these materials. Use only under a fume hood or a well ventilated area. In addition, use safety glasses and latex gloves.

3.3.1 FIRST AID

If exposure occurs, the following first aid steps shall be taken until medical attention can be obtained:

- a. Eye contact: Immediately flush with water for 15 minutes, minimum.
- b. Skin contact: Immediately flush with water. Wash with soap and water. Apply skin lotion to replace oils.

4.0 SURFACE CLEANING AND PREPARATION

- a. Housing surface: Wipe with 1,1,1 Trichloroethane using a lint free cloth and allow to air dry for five minutes.
- b. Thermistors: Wipe with isopropyl alcohol, reagent grade using lint free cloth as above.

5.0 MATERIALS PREPARATION

5.1 THERMAL EPOXY

Stir the filled epoxy until it is uniform in appearance. Weigh into a mixing container the following proportions of each component:

- a. 100 p.b.w Eccobond 285
- b. 4 p.b.w. Catalyst 9

The resin and curing agent shall be weighed to an accuracy of +/- 0.1 gram. The minimum batch size shall be 40 g. Eccobond 285 and 1.6 g. Catalyst 9.

SIZE A	FSCM NO. 88379	5-294-0	
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5.1.1 MIXING

Mix the parts thoroughly for 3 to 5 minutes, folding them together carefully. Avoid vigorous stirring which will mix in excessive amounts of air. Carefully scrape the sides and bottom of the mixing container at least twice during the mixing operation to force the surface layer into the body of the mixed compound. Scrape the layer from the spatula into the body of the mixed compound near the end of the mixing operation, and follow this with additional mixing. CAUTION : Do not exceed 10 minutes total time for mixing. After mixing, the material has an application life of 30 minutes maximum.

5.2 POLYURETHANE COMPOUND

If necessary, stir and heat each part of PR-1564 to 50 C maximum in their original containers until each is uniform in appearance. Allow the parts to stabilize at 18 to 28 C prior to further processing. Use precautions to prevent moisture contamination or cross- contamination of the parts.

- a. 7.7 p.b.w. Part A (catalyst)
- b. 100 p.b.w. Part B (prepolymer)
- c. 3 p.b.w. Silicon Dioxide.

All weights shall be to +/- 0.1 grams for batch weights up to 250 grams. The minimum batch weight shall be 110.7 grams. Purge both containers with gaseous nitrogen prior to resealing.

Mix the parts thoroughly for 3 to 5 minutes, folding them together carefully. Avoid vigorous stirring which will mix in excessive amounts of air. Carefully scrape the sides and bottom of the mixing container at least twice during the mixing operation to force the surface layer into the body of the mixed compound. Scrape the layer from the spatula into the body of the mixed compound near the end of the mixing operation, and follow this with additional mixing.

5.2.1 APPLICATION LIFE

The mixed compound has an application life of one hour maximum after mixing.

6.0 APPLICATION

6.1.1 THERMAL EPOXY BONDING

The mixed epoxy may be applied to one or both surfaces to be bonded. It shall be applied uniformly and without voids in the applied layer. A slight excess of adhesive is

SIZE A	FSCM NO. 88379	5-294-0	
SCALE		REV.	SHEET 4

desired in the applied layer. Align the surfaces to be bonded and apply light pressure sufficient to force the adhesive into contact with the surfaces, and if a slight excess of adhesive has been applied, to force some adhesive out of the bond zone.

6.1.2 CURE

The assembly shall be cured at room temperature for 24 hours minimum.

6.2.1 POLYURETHANE STAKING

The transducer shall be staked after application as in 6.1.1 and 6.1.2 . Apply a fillet of the compound as shown in figure 1. The fillet shall not totally surround the temperature device.

6.2.2 CURE

The applied compound shall be stabilized for 24 hours minimum at room ambient. Final cure may be accomplished at 50 degree vacuum bakeout 5-298-0, or 7 days at room ambient. Check the hardness specimen in order to verify the cure.

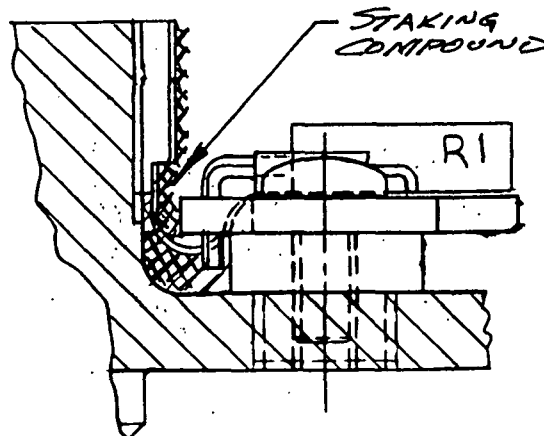


FIGURE 1

SIZE	FSCM NO.	5-294-0	
A	88379		
SCALE	REV.	SHEET	5

APPLICATION

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6/15/94

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FINISH

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SIZE

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SCALE

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SHEET

AEROFLEX

LABORATORIES
INCORPORATEDPLAINVIEW
N.Y. 11803PRE-ASSEMBLY VACUUM
BAKE - P/N 16187

A

88379

5-296-0

1

1.0 TITLE

Pre-Assembly Vacuum Baking for P/N 16187 Motor/Encoder

2.0 PURPOSE

To establish a uniform sequence to control vacuum baking of cleaned components prior to final assembly.

3.0 EQUIPMENT

Controlled Temperature Vacuum Oven (35 C- 200 C) with over temperature protection and capability of dry nitrogen soaking. Oven designation shall be IRM #1.

4.0 PROCEDURE

4.1 Place items to be vacuum baked on an appropriate carrier inside the oven and secure the oven door closed.

4.2 Turn on the vacuum pump, temperature and dry nitrogen control. Once the oven has reached 100 degrees C and a vacuum of < 100 microns, the time and date shall be recorded in a log book.

4.3 Maintain the temperature of the oven at 100 deg. C and the vacuum of 100 microns for 100 hours, minimum.

4.4 After 100 hours, remove the items from the oven and place in a nitrogen filled dry box. CAUTION: ASSEMBLY SHALL BE HANDLED WITH CLEAN LINT FREE GLOVES TO PREVENT CONTAMINATION .

4.5 Bag and tag items for the next assembly operation.

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SCALE	REV. A	SHEET	2

1.0 SCOPE

The purpose of this procedure is to describe the methods required to mechanically and electrically align the stator, rotor, and encoder of P/N 16187 to step position 1, as required by MSFC drawing SXI-201 and Aeroflex drawing 200-89.

2.0 STATOR- ROTOR ALIGNMENT AND STEP ANGLE VERIFICATION

- 2.1 Assemble the stator, P/N 500-29-9 and rotor P/N 400-29-6 in the motor housing, P/N 301-60. Attach fixture 527-191-1 to the rotor shaft and fixture 527-191-2 to the housing.
- 2.2 Rotate the stator until the rotor is in a mechanically stable position and the indicator on the fixture reads the 60 +/- 0.5 degree requirement in accordance with 200-89. This shall be position 1. In addition, apply 22 VDC to a motor phase and verify the shaft moves to the 7.5 degrees +/- .75 degree cw position on the indicator dial. Tag the wires causing this rotation # 1 (+22 VDC) and #3 (-22 VDC). Next, excite the remaining motor lead pair with 22 VDC in order to step to the next 7.5 degree position. Tag these wires # 2 (+22 VDC) and # 4 (-22 VDC). Finally, check that the cogging torque is greater than 0.25 in-oz. Once the mechanical and electrical step positions have been verified, scribe a line on the stator and housing in order to repeat position 1. Remove the rotor from the housing. Bond the stator into the housing using Stycast 2850 FT, catalyst 9 per 5-068-0, after realigning the scribe marks on the stator and housing.

3.0 ENCODER POSITION 1 VERIFICATION

- 3.1 After the stator bonding is completed, insert the rotor and reassemble the fixtures 527-191-1 and 521-191-2 as in paragraph 2.1. Re-check the stable position and step angle as in paragraph 2.2. Assemble the encoder disk in accordance with 110E381, paying attention to the etched line on the outer edge of the disc. This mark should line up with the outermost slot on the reticle when the motor is aligned for position 1. Make sure the disc to reticle gap is 0.010" to 0.015". Lightly tighten the set screw on the encoder hub. Apply +5.0 VDC to wire #12 and the return to wire #13. Verify that the encoder output when the stator and rotor are aligned as per paragraph 2.2 is the following:

OUTPUT BIT 1 : 0
OUTPUT BIT 2 : 0
OUTPUT BIT 3 : 0
OUTPUT BIT 4 : 1

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4.2 If the encoder output does not agree with this sequence, loosen the set screws and rotate the disk until there is agreement. Rotate the motor shaft cw and ccw between the ± 2 degree marks on the indicator dial. The sequence shown in 4.1 shall remain. If not, readjust the encoder disc until this occurs. Verify that encoder output 0010 occurs at the fourth sequential step (30 mechanical degrees) cw from position 1. In addition, verify that 1100 occurs 30 mechanical degrees ccw from position 1 by stepping the motor ccw. Once these position are verified, fill in the encoder end of the shaft P/N 402-29-9 with Stycast 2850 FT, catalyst 9 per 5-068-0. Lock the set screw threads with Stycast 2850 FT, catalyst 9, per 5-068-0.

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SCALE	REV. B	SHEET	3



APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
	16187	A	INITIAL RELEASE		
		B	PARA 4.2 & 4.3 - 50 DEG WAS 60 DEG.	7-8-94	

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	REV.	B	B																																

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.		
	DRAWN I.H. 2-1-94		
MATERIAL	CHECKED	POST ASSEMBLY VACUUM BAKE - 16187	
	ENGNRG. 7-8-94		
FINISH	DESIGN 7-8-94	SIZE A	FSCM NO. 88379
	QA J. Szolner 7/15/94	SCALE	WEIGHT
	MFG. 7/15/94	SHEET 1 OF 2	

ARESCO, HICKSVILLE, N. Y. - OGILVIE 038300

1.0 TITLE

Post-Assembly Vacuum Baking for P/N 16187 Motor/Encoder

2.0 PURPOSE

To establish a uniform sequence to control vacuum baking of the final assembly of P/N 16187.

3.0 EQUIPMENT

Controlled Temperature Vacuum Oven (35 C- 200 C) with over temperature protection and capability of dry nitrogen soaking. Oven designation shall be IRM #1.


4.0 PROCEDURE

- 4.1 In order to ensure cleanliness of IRM #1, vacuum bake the empty chamber at 150 deg C, 100 microns vacuum for 24 hours minimum. Cool down to 25 C in a nitrogen fill.
- 4.2 Place the unit to be vacuum baked in a container and seal the cover in order to remove the item from the Class 100 assembly area. Transfer the container to IRM #1, open the container, and using clean TC latex gloves, transfer the unit to the vacuum chamber and secure the oven door closed.
- 4.2 Turn on the vacuum pump, temperature and dry nitrogen control. Once the oven has reached 50 degrees C and a vacuum of < 100 microns, the time and date shall be recorded in a log book.
- 4.3 Maintain the temperature of the oven at 50 deg. C and the vacuum of 100 microns for 100 hours, minimum.
- 4.4 After 100 hours, remove the item from the oven and place in the transfer container.
- 4.5 Return the unit to the Class 100 assembly area.

SIZE A	FSCM NO. 88379	5-298-0
SCALE	REV. B	SHEET 2

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL RELEASE	7-8-94	ARF

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG.	 AEROFLEX LABORATORIES INCORPORATED	PLAINVIEW N Y 11803
	DRAWN <i>E. HOCKER</i> 7-7-94		CLEANLINESS CONTROL PROCEDURE, MOTOR ENCODER - 16187
MATERIAL	CHECKED		
	ENGNRG <i>[Signature]</i> 7-8-94		
FINISH	DESIGN <i>[Signature]</i>		
	QA <i>V. Devlin</i> 7/15/94	SIZE A	FSCM NO. 88379
MFG. <i>[Signature]</i> 7/15/94	SCALE	WEIGHT	SHEET 1 OF 5

058100 ARFCU, HICKSVILLE, N. Y. - OGILVIE

1.0 SCOPE

The purpose of this procedure is to establish a standard cleanliness control method for assembly of the stepper motor/encoder, P/N 16178.

2.0 APPLICABLE DOCUMENTS

MSFC-STD-246 REV B

STANDARD DESIGN AND
OPERATIONAL CRITERIA FOR
CONTROLLED ENVIRONMENTAL
AREAS

AEROFLEX 960-295

ASSEMBLY FLOW CHART
MOTOR/ENCODER

3.0 MANUFACTURING AND ASSEMBLY AREA REQUIREMENTS

3.1 MANUFACTURING AREA GENERAL REQUIREMENTS

As shown on the Assembly Flow Chart 960-295, all manufacturing operations shall be performed in the standard manufacturing environment until the material must enter a controlled assembly area for assembly in a class 100 laminar flow work station. Prior to entering the controlled assembly area, all material will be cleaned and vacuum baked. After vacuum baking, the material will be handled and packaged as described in the vacuum baking procedure 5-296-0.

3.2 CONTROLLED ASSEMBLY AREA REQUIREMENTS

3.2 LAMINAR FLOW WORK STATION-CLASS 100

3.2.1 TYPE

All operations listed in the assembly flow chart 960-295 as being performed in a Class 100 environment will be performed under a horizontal clean work station, Class 100 laminar flow bench.

3.2.2 WORK PIECE AND EQUIPMENT CONTROL

1. At no time will any assembly work be performed within a clean work station without the air blowers operating. It is recommended to maintain the air flow 24 hours per day if the assemblies are not covered to protect from contamination. If the station air is turned off at any time, work may not resume until air flow is turned on for at least ten minutes.
2. All assembly tools, fixtures, and containers shall be cleaned of particulate matter before placing them in the clean work station.

SIZE A	CAGE CODE 88379	5-305-0	
SCALE	REV. A	SHEET	2

3. The bench shall be kept as free as possible of any material not being used immediately. Nothing is to be placed along the back edge of the workbench nor between the work piece and the filters, since the laminar flow may be disturbed and particles may contact the work.
4. Papers and paper products are not allowed inside a clean workbench. In addition, pencils are not allowed.

3.2.3 OPERATIONAL TECHNIQUES AND PROCEDURES

1. All workers using the laminar flow bench shall wear smocks with snug fitting wristbands. In addition, clean room gloves shall be worn when handling parts in the clean work station. Proper head covering must also be used if close inspection of the work piece is required where the worker must lean over the part.
2. Clean parts transported in protective containers are to be removed from the containers only inside the bench or in the unobstructed airstream directly outside of the station until the part is replaced and the container re-closed. The containers may be stored elsewhere if precautions are taken to preserve their cleanliness.
3. Storage for tools not in use shall be provided. A separate tray or wire mesh container is recommended.
4. The working area and all surfaces shall be kept clean and orderly.

3.2.4 GENERAL MAINTENANCE

1. Air velocity across the work area shall be checked at least once every three months to determine that proper air flow is being maintained across the filter face (100 feet per minute at standard temperature and pressure). If the airflow is under 75 feet per minute or has more than a 25 fpm variation in localized areas, check the blowers and filters for leaks.
2. Filters can be inspected for leaks by measuring the particle contamination level of air passing through them. If a leak is determined, determine by closer inspection if it is due to a poor seal or in the filter itself. Replace the filter or tighten the seal, as necessary.
3. When replacing HEPA filters, it is important that care be taken to assure that the filters are properly sealed in their supporting frames.
4. Before a newly installed filter is used, the particulate count in the clean work area shall be monitored per

SIZE A	CAGE CODE 88379	5-305-0	
SCALE	REV. A	SHEET 3	

paragraph 3.2.5 .

3.2.5 MONITORING PROCEDURES

1. PARTICULATE MONITORING

Particulate monitoring for the certification of a clean work station shall be accomplished with an automatic particle counter whose calibration has been performed in accordance with the manufacturer's specifications and is current. Automatic particle counters are required for all class 100,000 or cleaner facilities. Particulate monitoring shall be done in an area as close to the work as possible, and shall be performed at least once every three months.

2. TEMPERATURE MONITORING

- a. Temperature monitoring may be achieved by using a thermometer or a similar portable measuring device.
- b. Temperature readings shall be made daily, and records kept for weekly examination.
- c. The temperature at a 3 to 5 foot elevation in an area surrounding the work is of prime importance, and must be maintained at 72 deg. F \pm 5 deg.F

3. HUMIDITY MONITORING

Conventional wet and dry-bulb thermometers may be used for readings. The humidity shall be monitored daily, and records kept for monthly examination. The relative humidity shall be 45% \pm 5% .

4. AIR FLOW MONITORING

The air velocity in the clean work station shall be measured with a small (preferably hand-held) air velocity meter. The airflow shall be monitored with the same frequency as particle count. The flow rate shall be 100 ft/min \pm 25 ft/min. at ambient temperature and pressure.

3.3 CONTROLLED AREA REQUIREMENTS

3.3.1 DEFINITION OF CONTROLLED AREA

The room in which the laminar flow bench is located shall be a controlled area. The room air conditioning provides temperature and humidity control, and HEPA filters for the room air supply provide particle control. The air recirculated through the laminar flow bench in such a


SIZE A	CAGE CODE 88379	5-305-0	
SCALE	REV. A	SHEET 4	

controlled area will cause the room's particle count to approximate the flow bench's contamination level; therefore, work garments, meters, tools, fixtures and containers may be stored in the controlled area. Temperature and humidity shall be monitored as per 3.2.5 .

SIZE A	CAGE CODE 88379	5-305-0	
SCALE		REV. A	SHEET 5

960-229

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	RE-TYPED REL 352	11-10-82	MAZ
		B	REVISED PER ECN 10601	2-21-84	MAZ

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	DRAWING STARTED	DATE	 AEROFLEX LABORATORIES INC. SOUTH SERVICE ROAD • PLAINVIEW LONG ISLAND, NY 11803		
	DRAWN				
MATERIAL	CHECKED	11-12-82	CEMENTING PROCEDURE FOR BONDMASTER M620 (ARX-612-20)		
	ENGR	11-12-82			
FINISH	AA	11-12-82	SIZE	FSCM NO.	960-229
	MFA	11/16/82	A	88379	
			SCALE	WEIGHT	SHEET 1 OF 3

960-229

960-229

1.0 TITLE

Cementing Procedure for Bondmaster M620 (ARX-612-20)

2.0 PURPOSE

To establish a uniform procedure to control the cementing with Bondmaster M620.

3.0 PREPARATION OF CEMENT

Bondmaster M620 is a one-part, no mix, 100%-reactive, solvent-free epoxy adhesive to be used as supplied from Vendor.

4.0 SURFACE PREPARATION

All bonding surfaces must be thoroughly cleaned, degreased and dried.

5.0 APPLICATION

5.1 Apply enough Bondmaster M620 to fill all cavities and depressions in both surfaces being bonded and to leave about 4-6 mils of adhesive in the final glue line. This may be accomplished by coating 4-6 mils on one surface only or by coating 2-3 mils on each surface. If one surface is porous, more adhesive must be applied to fill the voids and yet produce a final glue line thickness of 4-6 mils.

5.2 Position and assemble parts in proper location. Press parts together firmly enough to establish and maintain intimate contact during cure.

5.3 Remove excess adhesive from parts using a clean cloth moistened with MEK.

SIZE A	CODE IDENT NO. 88379	960-229	
SCALE		SHEET	2 OF 3

960-229

960-229

6.0 CURING CYCLES

6.1 Cure adhesive using one of the following cure time/temperature combinations.

- (a) 130°C (266°F) $\pm 5^\circ$ 25 Hours
- (b) 150°C (302°F) $\pm 5^\circ$ 6 Hours
- (c) 175°C (347°F) $\pm 5^\circ$ 3 Hours
- (d) 140°-150°C (284°-302°F) 12 Hrs (Do Not Exceed 150°C)
- (e) 204°C (400°F) $\pm 5^\circ$ 1 Hour

6.2 Remove parts from oven and cool to room temperature.

SIZE A	CODE IDENT NO. 88379	960-229
SCALE		SHEET 3 OF 3

960-229

1.0 TITLE

General cleaning procedure using isopropyl alcohol.

2.0 PURPOSE

This procedure can be used when cleaning prior to bonding, coating, or other indicated assembly operations.

3.0 EQUIPMENT AND MATERIALS

2-Propanol (Isopropyl Alcohol) 99.5+% Reagent Grade

Bottle brush (nylon bristles or similar material)

Dry Filtered Air

Glass or polypropylene container rinsed with isopropyl alcohol

Rubber (Neoprene) gloves 22 mil.

Safety goggles

4.0 PROCEDURE

4.1 Place the parts to be cleaned into a container with enough isopropyl alcohol to cover the part. All work shall be done under a fume hood vented to the outside of the plant. Workers must wear safety goggles and rubber gloves. While the part is submerged, brush all exposed surfaces.

4.2 Remove the part from the bath and blow off any excess liquid with dry filtered air. Place the part in a clean plastic container.

4.3 The part is now ready for the next assembly sequence.

SIZE A	FSCM NO. 88379	5-316-0	
SCALE		REV. A	SHEET 2

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	Retyped - Shelf Life was 6 Months RC532	11/4/82	<i>mf</i>
		B	REVISED PER ECN 10601	2-21-84	<i>mf</i>
		C	REVISED PER ECN 18004	4-02-93	D.I.

BONDMASTER CEMENTING SPECIFICATION

1.0 PREPARATION OF RESIN MIXTURE

Before use, Bondmaster E645 (ARX No. 612-3), Part I must be mixed thoroughly with Part II in the following proportions:

Parts by weight: 100 Part I plus 30 Part II

Parts by volume: 100 Part I plus 35 Part II

If a reduction in viscosity is needed in order to apply this adhesive more effectively, mixed BONDMASTER E645 can be diluted with methyl-ethyl ketone (MEK). When roller coating, dilute with MEK until when checking with a #2 Dow Corning Viscosity Cup a time of 16-18 seconds is achieved.


2.0 APPLYING THE ADHESIVE

Mixed BONDMASTER E645 can be applied by brushing, spraying, dipping or roller coating. For small parts, it can be easily dispensed through a hypodermic needle. To get maximum adhesion, all surfaces must be perfectly clean and thoroughly degreased.

3.0 DRYING THE ADHESIVE

The adhesive must be thoroughly dry before curing. After applying BONDMASTER E645, one of two drying schedules must be followed:

- (a) Air dry for 4 hours minimum.
- (b) 125°F ±5° for 20 minutes minimum.

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FRAC.	DEC.	ANG.	DRAWN				
MATERIAL		CHECKED		DATE		CEMENTING PROCEDURE BONDMASTER E645, ARX 612-3 LOW OUTGASSING	
		ENGR		DATE			
		<i>Mr. A. J. Deoli</i> 2/24/84		SIZE A		FSCM NO. 88379	
DESG		2/24/84		SCALE		WEIGHT	
						SHEET 1 of 2	

960-251

4.0 CURING THE ADHESIVE

Before curing, BONDMASTER E645 is thermoplastic and flows freely as the temperature is raised. Magnet material curing shall be done at a reduced temperature as indicated below. All other material shall use the elevated temperature.

(a) <u>Cure Temperature</u>		<u>Minimum Cure Time</u>
400°F	205°C $\pm 5^\circ$	2 Hours
284°F	140°C $\pm 5^\circ$	12 Hours (For Magnet Material)

(b) Post Cure Temperature (in vacuum oven)

275°F	135°C $\pm 5^\circ$	36 Hours
-------	---------------------	----------

5.0 CLEANING THE CEMENT

Excess uncured BONDMASTER E645 can easily be removed from equipment or work areas with MEK. However, after adhesive is cured it can be removed only by filing, chipping, grinding or sandblasting.

6.0 STORAGE LIFE

Part I and Part II should be stored in a cool, dry area (50°-85°F). All containers of Part I and Part II shall be dated when received. Normal shelf life for the BONDMASTER E645 in its shipping containers shall be one (1) year.

7.0 CAUTION


BONDMASTER E645 contains a volatile, flammable solvent. Provide adequate ventilation. Avoid sparks. Do not use near open flame or spark-producing equipment.

SIZE A	CODE IDENT NO. 88379	960 251
SCALE		SHEET 2

157-0016

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL RELEASE	4-15-93	ARF
		B	REVISED	7-8-94	ARF

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		REV.	B	B	B	B																														

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	DRAWN <i>E. HOCHLE</i> 11-12-93			
	CHECKED	CONTAMINATION CONTROL AND IMPLEMENTATION PLAN, SXI MOTOR/ENCODER		
	ENGRG. <i>ARF</i> 11-15-93			
MATERIAL	DESIGN	SIZE A	FSCM NO. 88379	110P371
FINISH	QA <i>J. DeLoe</i> 7/15/94	SCALE	WEIGHT	SHEET 1 OF 4
	MFG. <i>ARF</i> 7/15/94			

Contamination Control and Implementation
Plan, (SXI) Motor/Encoder

Data Requirement Description No. 763MP-003

For

NASA/MSFC Contract No. NAS8-39409

ARESCO, HICKSVILLE, N. Y. - OGILVIE 075900

SIZE A	CAGE CODE 88379	110P371	
SCALE		REV. B	SHEET 2

CONTAMINATION CONTROL
AND IMPLEMENTATION PLAN
(DRD NO. 763MP-003)

1.0 SCOPE

This plan outlines the procedures and steps necessary to maintain the cleanliness of the brushless stepper motor/encoder manufactured under contract number NAS8-39409.

2.0 APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

MFSC-STD-506	Standard, Materials and Processes Control
JSC SP-R-0022	Vacuum Stability Requirements of Polymeric Materials for Spacecraft Applications
NHB 6000.1D	Requirements for Packaging, Handling, and Transportation
NASA-TM-86538	Design and Verification Guidelines for Vibroacoustics and Transient Analysis

2.2 NON-GOVERNMENT DOCUMENTS

ARX 960-295	Assembly Flow Chart, Motor/Encoder
GAP-21-268	Cleanliness and Atmospheric Control
GAP-21-312	Monitoring Procedures for Cleanliness and Atmospheric Environments
ARX 5-305-0	Cleanliness Control Procedure P/N 16187
ARX 5-296-0	Vacuum Bake Procedure for Subassemblies P/N 16187
ARX 5-298-0	Vacuum Bake Procedure for Motor/Encoder P/N 16187

3.0 PLAN OUTLINE

3.1 CLEANING METHODOLOGY AND FREQUENCY

All cleaning steps and procedures are described in the assembly flow chart, ARX 960-295.

3.2 ENVIRONMENT DEFINITION AND MONITORING

The environment is maintained under a Class 100 laminar flow bench, in accordance with 5-305-0. All assembly steps

SIZE A	CAGE CODE 88379	110P371	
SCALE	REV. B	SHEET	3

done in this environment are described in the flow chart. Particle count is measured by a Met One Model 200 Clean Room Monitor as per Aeroflex QAP 21- 312. Documentation of temperature, humidity, and particle count shall be performed using the guidelines of Aeroflex QAP21 - 268. Note that although these procedures refer to Class 10,000 and Class 100,000 clean rooms, the methods are the same for lower particle counts. All tests not done under the laminar flow bench will be performed with the motor sealed in the class 100 environment in a metal container, which will then be moved to the test site. Vacuum baking and environmental testing may also be performed in a class 10,000 environment. Exposure time in this environment shall be minimized to the extent required to complete these processes.

3.3 THERMAL VACUUM BAKEOUT CRITERIA

All detailed and assembled parts shall be subjected to a thermal vacuum bakeout of at least 100 hours at 100 deg.C at 0.1 Torr (100 microns) as required in the flow chart; however, any assembly containing Braycote 601 lubricated ball bearings shall be subjected to a bakeout of 100 hours at 50 deg. C at 0.1 Torr. Any assemblies requiring bakeout in the class 100 environment shall be transported in the container described in 3.2 and placed in a vacuum oven while in a class 10,000 environment.

3.4 CONTAMINATION VIOLATION REPORTING AND EFFECTS ASSESSMENT

All contamination violations shall be reported as per QAP21-268. All corrective actions are done according to this document as well.

3.5 CLEAN ROOM GARMENT, CONTROLS, AND MONITORING

All clean room work shall be done with an acceptable smock and head cover as per QAP21-268. Gloves shall be triple cleaned (TC) latex.


3.6 BAGGING AND PACKAGING CRITERIA AND MATERIALS

The motor/encoder shall be sealed in an appropriate anti-static bag in the Class 100 environment. It shall then be sealed in a clear polyethylene bag. The motor/encoder will then be shipped in a container in accordance with NHB 6000.1D and NASA-TM-86538, Section VI.

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SCALE	REV. B	SHEET 4	

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL RELEASE	10/14/94	<i>jm</i>
		B	REVISED	6-12-95	<i>AK</i>

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED		SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
		REV.	B	B	B	B	B	B																												

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FRAC. DEC. ANG.		DRAWN				INCORPORATED	NY 11803
MATERIAL		CHECKED				PACK & PACKAGING PROCEDURE FOR SXI STEPPER MOTOR / ENCODER	
FINISH		ENGNRG.			SIZE	FSCM NO.	110P374
		DESIGN	<i>jm</i>		A	88379	
		QA	<i>C. J. Fodesta</i>		SCALE	WEIGHT	SHEET 1 of 6
		MFG	<i>CWG-13.25</i>				

1.0 Title: Pack & Packaging Procedure for SXI Stepper Motor/Encoder, P/N 16187

2.0 Purpose:

To establish a standard operating procedure for the pack and packaging of the SXI Stepper Motor/Encoder, P/N 16187.

3.0 Required Materials:

Dry Nitrogen

Labels, Self Adhesive

ESD Warning Label

MIL-STD-129

Marking for Shipment and Storage

Mylar Tape

Permacel P.256

Anti-Static Bags

3M 2100

Expanded Foam Sheet

Smock

Latex Gloves

Fiberboard Box

Gummed Reenforced Tape

4.0 Procedure:

4.1 All pack & packaging shall be done in a Class 100 & Class 10,000 controlled environment per FED-STD-209 and Aeroflex Laboratories Procedure QAP21-268, "Cleanliness & Atmospheric Control" and as specified herein. The operator shall wear a Smock, Head Cover, & Latex Gloves while in the Class 100 & 10,000 environment.

4.2 The following operations shall be performed in a Class 100 environment.

4.3 The operator performing this operation shall confirm that the SXI Stepper Motor/Encoder has been cleaned per manufacturing traveler requirements prior to starting this operation. The unit shall be free of all dust, dirt, grease, oil, and other foreign material or contaminants prior to the unit packing.

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SCALE	REV. B	SHEET	2

- 4.4 The Leads of the unit shall be trimmed of all stripped ends. If this is not the condition of the unit it must be returned to the Manufacturing Supervisor to have this operation performed. The unit must then undergo inspection & cleaning prior to the restarting of the packaging process.
- 4.5 The Leads of the unit are to be carefully coiled in an approximately 6 inch loop. The lead wires must not be sharply bent or crimped during this process. Caution must be taken not to pull on the leads which are connected to the motor unit.
- 4.6 The leads shall then be carefully inserted into an Anti-Static Bag. The Bag shall then be purged with Dry Nitrogen by inserting a feeder tube into the bag and allowing the Dry Nitrogen to flow into the bag for a period of 20 seconds minimum. After this time period the feeder tube shall be withdrawn from the bag and the bag shall be closed by folding to the point of the wire exit. See Figure 1.



Figure 1.

- 4.7 Insert carefully the Stepper/Encoder Motor into another Anti-Static bag and then purge the bag with Dry Nitrogen by inserting the feeder tube into the bag and allowing the purge to continue for 20 seconds minimum. After this time period the feeder tube shall be withdrawn from the bag and the bag shall be closed by folding to the point of the wire exit. See Figure 1.

NOTE: Care shall be taken not to damage the unit.

SIZE A	CAGE CODE 88379	110P374	
SCALE	REV. B	SHEET	3

- 4.8 Insert both bags (unit & wire) into another Anti-Static bag and purge per 4.7. After purging secure closed by folding the open end at least three (3) times and secure closed with mylar tape.

Repeat this process by inserting into a second bag and closing with mylar tape after purging.

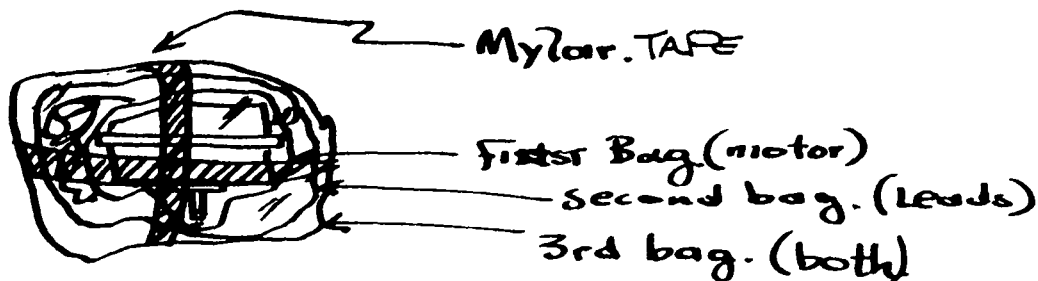


Figure 2

- 5.0 The following operations shall be performed in a Class 10,000 environment.
- 6.0 The taped bags shall then be wrapped with the foam sheet, and then secured with the mylar tape in the center of the wrap. See Figure 3

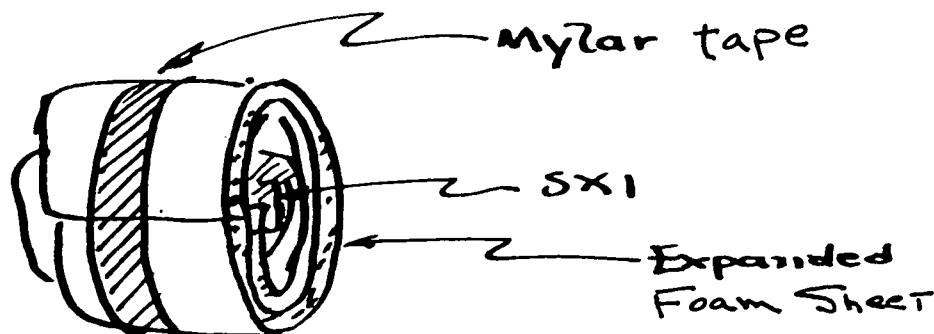
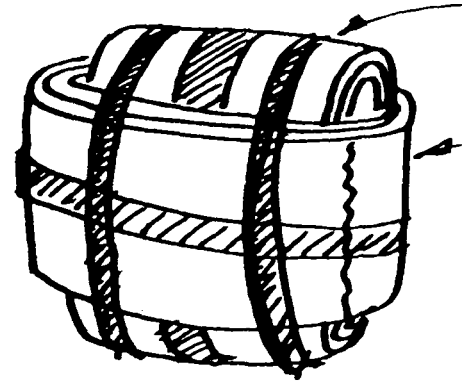


Figure 3

SIZE A	CAGE CODE 88379	110P374	
SCALE		REV. B	SHEET 4

- 6.1 The foam cushioned unit shall then shall form a cross pattern. This w the wrap and then on either end.



F

- 6.2 Place complete package in an al seal.

- 6.3 The operator shall then place an ac label shall contain the following in

- a) NASA Contract Number
- b) CLIN (Contract Line Item Numt
- c) Stepper Motor/Encoder
- d) Aeroflex P/N: 16187 Revision (
- e) Serial Number
- f) FSCM: 88379
- g) Quantity: () each

In addition to the above label an E on the package next to the label (

- 7.0 The following operations shall be

- 7.1 The package shall then be placed shall then be sealed with nylon re- and ESD warning label cited in ste the top/center of the sealed box.

- 7.2 This intermediate package shall then be placed in a second fiberboard box. Test Data or Certificate of Compliance shall be placed in an anti-static bag and labeled as "Test Data/Certificate of Compliance Enclosed"
- 7.3 This exterior package shall then be sealed using nylon re-enforced gummed tape. The box shall be labeled using the NASA Label Critical Item Label Form 1366 that will be supplied by NASA through the Aeroflex Contracts office.
- 7.4 The exterior shipping box shall then be labeled with an ESD warning label and shipping label for delivery address/location.
- 7.5 No deviation is allowed from this procedure. Any questions in regard to this procedure shall be referred to the Quality Assurance Manager.
- 7.6 Any material or process that is non-compliance with this procedure shall be documented per Aeroflex procedure QAP21-235, "Control of Non-Conforming Material". Quality Assurance shall be notified immediately of any non-conformances found in materials or process as they may occur.

SIZE A	CAGE CODE 88379	110P374	
SCALE	REV. B	SHEET	6

ARESCO, HICKSVILLE, N. Y. - OGILVIE 058300

APPLICATION			REVISIONS			
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	16187	B	INITIAL RELEASE	8-22-94	[Signature]	

ALL PAGES ARE OF ORIGINAL ISSUE EXCEPT AS NOTED	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	REV.	B	B	B	B	B	B	B	B	B	B	B	B	B	B																				

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	DRAWN	IA 2-1-94	
MATERIAL ~	CHECKED	ACCEPTANCE TEST PROCEDURE - MOTOR / ENCODER - 16187	
	ENGNRG.	[Signature] 8-22-94	
FINISH ~	DESIGN	SIZE	FSCM NO.
	QA	A	88379
	MFG.	SCALE	WEIGHT
	[Signature] 8/22/94	~	~

ATP 20049	
SHEET	1 OF 14

1.0 SCOPE

1.1 INTRODUCTION

This procedure describes the tests and environments required to establish acceptance of the Aeroflex Brushless Step Motor/Encoder, Part Number 16187 in accordance with MSFC Drawing SXI-201 and NASB-39409, Appendix A.

1.2 APPLICABLE DOCUMENTS

NASB-39409 Appendix A

All referenced documents
in Par. 2.1

Aeroflex Procedure 5-297-0

Procedure for Alignment
of Motor and Encoder

2.0 TEST EQUIPMENT

Waters 1.2 in-oz full scale bidirectional Torque Watch

Waters 20 in-oz full scale bidirectional Torque Watch

Leeds and Northrup resistance Bridge

Hewlett Packard LCR meter Model 4261A

General Radio Model 1864 megohmmeter

AR Hypot Model 4006

Digital Multimeter HP 3466A

DC Power Supply Hewlett Packard Model 6111A

Lambda regulated Power Supply Model LH124BFM

Tektronix 2445 oscilloscope

Gould Model RS 3200 Chart Recorders

Tenney TTRG Environmental Chamber

Veeco Diffusion Pump

Vibration, Noise, and Shock Equipment TBD by Testing Labs

SIZE A	FSCM NO. 88379	<i>ATP20049</i>	
SCALE		REV. <i>B</i>	SHEET <i>2</i>

3.0 MECHANICAL AND ELECTRICAL CHARACTERISTICS

3.1 TORQUE AND OPERATING POINT

3.1.1 DETENT TORQUE

Using a torque watch with a 0-40 oz-in. range, measure the detent torque of the motor through three cogging positions, rotating ccw. The detent torque shall be 0.25 oz-in minimum at each position.

3.1.2 OPERATING TORQUE

Connect the motor as per Figure 1. Using an oscilloscope, adjust the test circuit until it is operating at 4.8 pulses per second at 22 VDC minimum, 25 VDC maximum, measured at the motor leads. Attach a thin thread to the motor shaft, and attach weights equivalent to 5.5 oz-in to the other end of the thread. The weight equivalent is determined by dividing the 5.5 oz-in requirement by the shaft radius in inches. Apply the proper voltage to the test circuit, and count the number of shaft revolutions in one minute. The motor shall lift the weights and rotate at 6 rpm minimum.

3.1.3 STALL TORQUE

Apply the required voltage to the test circuit, and using a torque watch with a 0-40 oz-in range, measure the torque required to stall the motor. The stall torque shall be 6.0 oz-in minimum at 22 VDC.

3.2 MOTOR ELECTRICAL CHARACTERISTICS

3.2.1 STEP ANGLE

Attach fixture 527-191- 1 to the motor housing mounting screws. Attach indicator arm 527-191-2 to the motor shaft. Align the indicator arm with the zero degree position on the fixture. Apply 22 VDC to the winding labeled #1 (+22 VDC) and #3 (RTN). The motor shall step 7.5 degrees +/-0.75 degrees clockwise when viewed from the indicator arm. Repeat with wires #2 and #4, and verify clockwise rotation 7.5 degrees +/- 0.75 degrees. Continue with reverse polarity on #1 and # 3, #2 and #4. Repeat procedure for one full rotation cw. The angle indicator shall return to the zero position +/- 0.75 degrees.

3.2.2 WINDING RESISTANCE AT 20 DEGREES C.

Using a Wheatstone bridge , measure the winding resistance between wires #1 and #3 and between wires #2 and #4. Record these readings and the room temperature. The resistance for each phase shall then be calculated to verify 77.6 ohms

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE	REV. B	SHEET	3

minimum at 20 degrees C.

3.2.3 WINDING INDUCTANCE

Using a digital LCR bridge, measure the inductance between wires #1 and #3, and between wires #2 and #4. This value shall be recorded for reference only.

3.2.4 INSULATION RESISTANCE AND DIELECTRIC STRENGTH

3.2.4.1 STATOR WINDING TEST PRE-IMPREGNATION

Tie together wires 1 and 3, 2 and 4. Using a megohmmeter, apply 100 VDC between the tied together motor windings and the stator core for one minute. The insulation resistance shall be 100 Megohms minimum. Measure the insulation resistance (100 Megohms minimum) between the tied together motor windings. Using a Hypot, apply 250 VRMS, 60 Hz between the tied together motor leads and the stator core for one minute. Next, apply 250 VRMS 60 Hz between the tied together motor leads. The leakage current shall not exceed 100 microamperes for both cases.

3.2.4.2 MOTOR TEST POST-IMPREGNATION

Tie together wires 1 and 3, 2 and 4. Using a megohmmeter, apply 100 VDC between the tied together motor windings and the housing for one minute. Next, apply 100 VDC between the tied together motor windings for 1 minute. The insulation resistance shall be 100 Megohms minimum for both cases. Using a Hypot, apply 125 VRMS, 60 Hz between the tied together motor leads and the stator for one minute. Next, apply 125 VRMS, 60 Hz between the tied together motor leads for one minute. The leakage current shall not exceed 100 microamperes for both cases.

3.3 ENCODER ELECTRICAL CHARACTERISTICS

3.3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Realign the indicator arm to the zero position. Connect test circuit to the encoder output wires, as shown in Figure 2. Apply +5 VDC ± 0.2 V to the input wires and verify the output is according to Table 1 for encoder position 1. In addition, measure the output voltage across bit 4 and verify this voltage is not less than 3.5 VDC with 4.8 VDC at the input.

3.3.2 ENCODER POSITION VERIFICATION

With the encoder input voltage as in 3.3.1, apply 22 VDC to alternating phases according to the Table 1, and stop at step 4. The encoder output shall be in accordance with

SIZE A	FSCM NO. 88379	ATP20049	
SCALE	REV. B	SHEET	4

Table 1 at this step. Verify the remaining encoder outputs according to Table 1. The requirement that the encoder position shall be \pm one half the motor's step angle has been verified in procedure 5-297-0.

3.4 MOTOR/ENCODER PHYSICAL CHARACTERISTICS

3.4.1 SIZE AND CONFIGURATION

The size and configuration of the motor/encoder shall be in accordance with MSFC Drawing SXI- 201 and Aeroflex Drawing 200-38. These dimensions shall be verified at final inspection.

3.4.2 WEIGHT

The weight of the motor/encoder shall not exceed 15 ounces.

3.4.3 RADIAL DEFLECTION

Assemble the motor/encoder in fixture 527-192 . Adjust a dial indicator capable of reading 0.0001 inch deflection to its zero reading on the motor shaft. Using a force gauge, apply a 9.0 \pm 0.1 lb. force on the shaft, in accordance with Drawing SXI-201, Proof Load Diagram. The resulting deflection shall be 0.0015 inches maximum.

4.0 ENVIRONMENTAL TESTS

4.1 CHARACTERISTICS AT THERMAL VACUUM CONDITIONS

4.1.1 MOTOR/ENCODER CONNECTIONS

Attach a three oz-in² load simulator to the motor shaft. Place the motor/encoder in a clean thermal vacuum container. Connect the motor windings and encoder wires to the feedthrough connections in the container and connect the test circuits to the outside, as per Figure 3. In addition, connect the AD590 temperature sensor leads to a feedthrough connection and connect a trim circuit to the outside, as per Figure 3. Verify step rotation of the motor as per paragraph 3.2.1, and verify encoder output, as per paragraph 3.3.2. In addition, check the room ambient temperature in degrees Kelvin (Degrees C + 273) is equivalent to the temperature sensor mv output. Once this is done , the container can be sealed and transported to the thermal vacuum location.

4.1.2 THERMAL VACUUM OPERATION

Set a controlled temperature environmental chamber to 25

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE	REV. B	SHEET	5

Table 1 at this step. Verify the remaining encoder outputs according to Table 1. The requirement that the encoder position shall be \pm one half the motor's step angle has been verified in procedure 5-297-0.

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4.1.2 THERMAL VACUUM OPERATION

Set a controlled temperature environmental chamber to 25

*DUPLICATE
OF SHEET
5*

*SEE SHEET
5*

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE	REV. B	SHEET	6

degrees C. Place a humidity indicator in the chamber. Seal the porthole, and fill the chamber with dry nitrogen gas. When the relative humidity (RH) goes below 70 %, place the vacuum container in the temperature chamber. Verify the RH is still < 70% . Connect the container pipe to a diffusion pump, and begin mechanical roughing. Follow the manufacturer's operation sequence for the diffusion pump in order to achieve 1×10^{-5} torr. Follow the cycle and test points in Figure 4. Verify temperature soaks using the AD590 sensor. Perform all functional tests after one hour soak at the indicated temperatures.

4.1.3 MOTOR/ ENCODER FUNCTIONAL TESTS AT THERMAL VACUUM CYCLES

4.1.3.1 VERIFICATION OF OPERATION UNDER LOAD

Connect chart recorder channels across current sensing shunts in series with the motor leads, as shown in Figure 3. In addition , connect one recorder channel to each encoder output. Apply the operating voltage to the test circuits for motor and encoder, and record the motor current and encoder output "high" voltage (3.5 VDC minimum) for one minute. There shall be no interruptions in the recorder traces during this time.

4.1.3.2 STALL OPERATION

Disconnect the motor from the test circuit. Apply 200 mA through wires #1 and #3 for 30 seconds. This current corresponds to the current at stall. Keep the power off for 60 seconds, repeat power on, and continue this sequence ten times. After this cycle, check operation as per paragraph 4.1.3.1 .

4.1.3.3 PROCEDURE FOR ENDING THERMAL VACUUM CYCLE

Soak the container at 25 C for 1 hour minimum. Verify RH < 70% , and proceed to shut down the diffusion pump and mechanical roughing according to the manufacturer's operating sequence. When the input gauge reads 450-760 torr, the container can be vented and disconnected from the pump. Return the sealed container to the clean room.

4.2 THERMAL CYCLING TEST AMBIENT PRESSURE

Perform a preliminary functional test at ambient temperature in a Class 100 environment in accordance with paragraphs 3.1.3, 3.2.1, 3.3.1 and 3.3.2 .

Place the motor (in a clean sealed container) in a air convection environmental chamber . The container and connections shall be per Figure 3. Fill the chamber with dry nitrogen. Ramp the temperature up to 50 degrees C at a rate of 3 degree C per hour, allow the motor to stabilize at this temperature for 1 hour minimum, and perform the functional

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE	REV. B	SHEET	7

tests as in 4.1.3.1 and 4.1.3.2. After this test, ramp the temperature down to -40 degrees C. Stabilize and test the unit in the same manner as in the hot cycle . Repeat for 24 cycles, performing functional tests at the final cycle.

4.3 TEST SEQUENCE FOR VIBRATION AND SHOCK

Check that the load simulation disk is securely attached to the motor shaft. Fasten the motor to the base of container 527-193 and seal the container cover. Transport the container to the environmental testing facility, and perform the sine ,random vibration, and shock according to Table 2. The functional tests after each environment must be done in a class 100 clean area. The noise test must also be conducted in a class 100 clean room with the cover off. In addition to the functional tests, visually inspect the motor for any damage.

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE		REV. B	SHEET 8

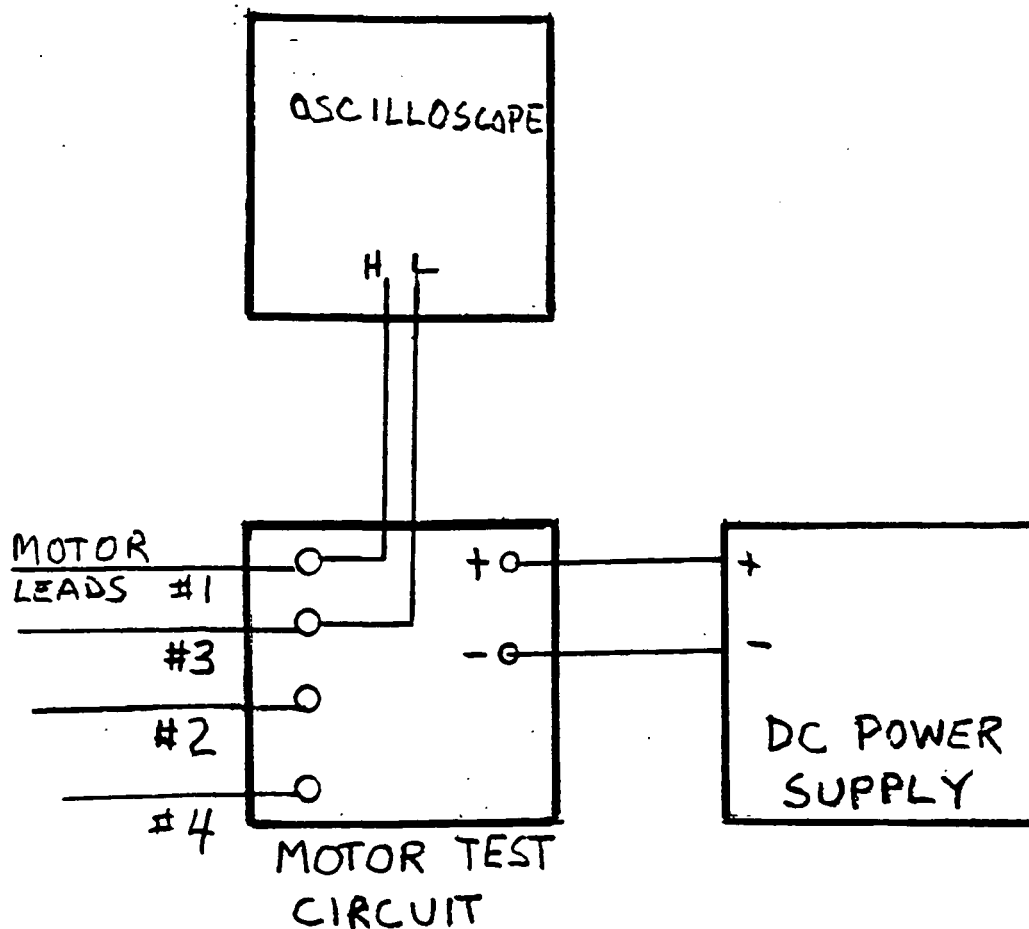


FIGURE 1

SIZE	FSCM NO.	ATP20049	
A	88379		
SCALE	REV. B	SHEET 9	

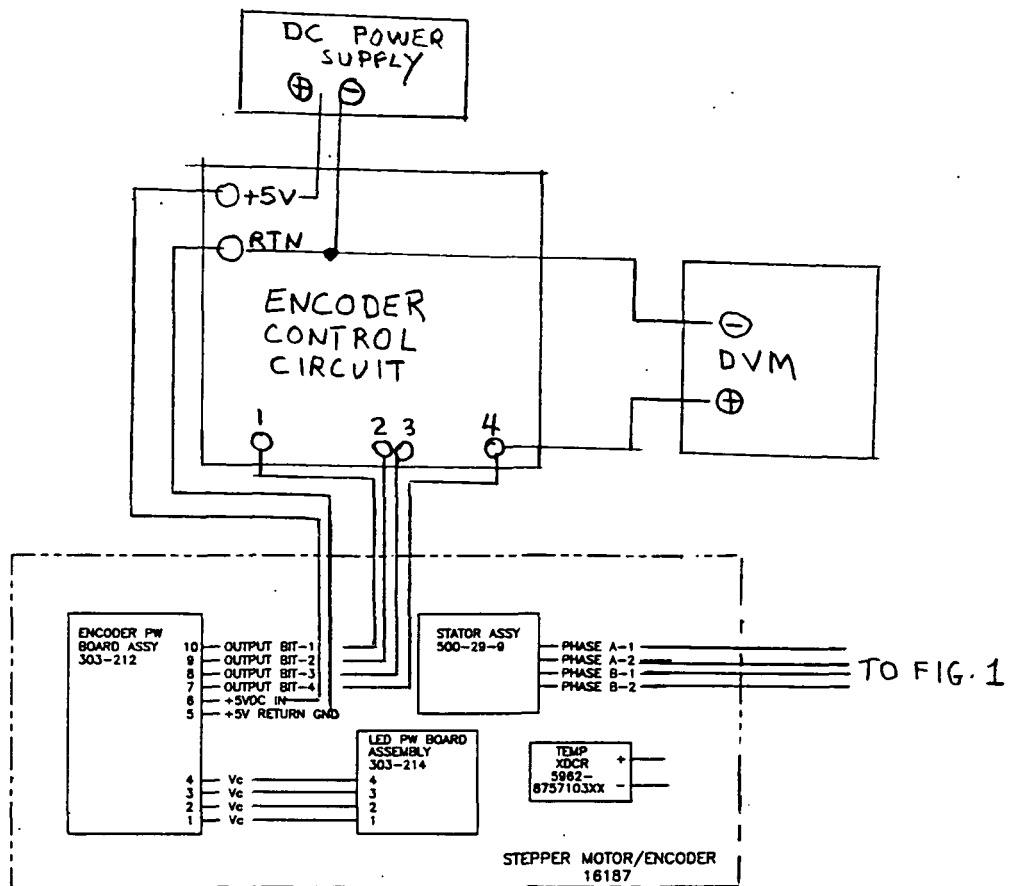


FIGURE 2

SIZE A	FSCM NO. 88379	<i>ATP 20049</i>	
SCALE	REV. <i>B</i>	SHEET <i>10</i>	

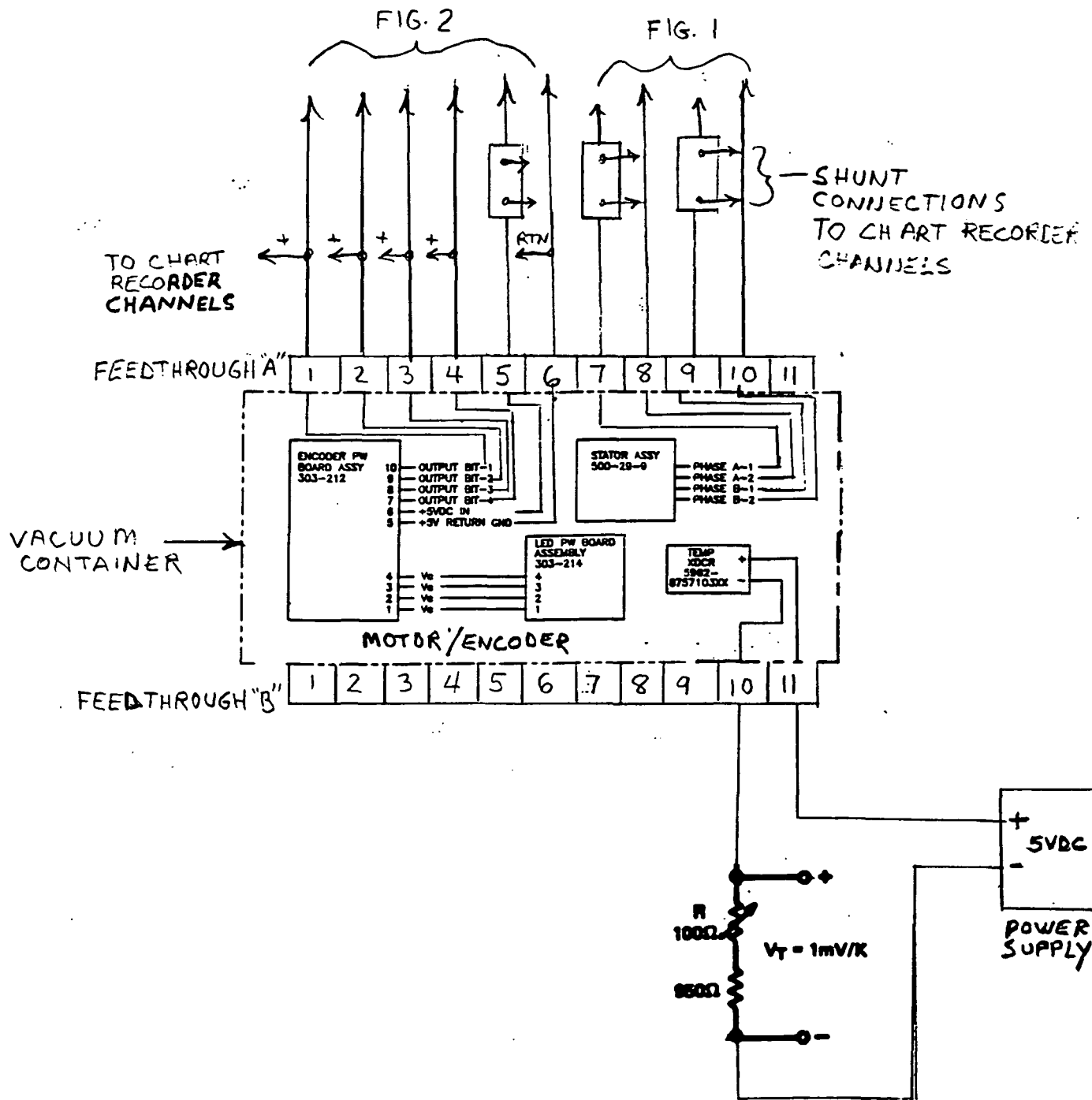


FIGURE 3

SIZE A	FSCM NO. 88379	ATP20049
SCALE	REV. B	SHEET 11

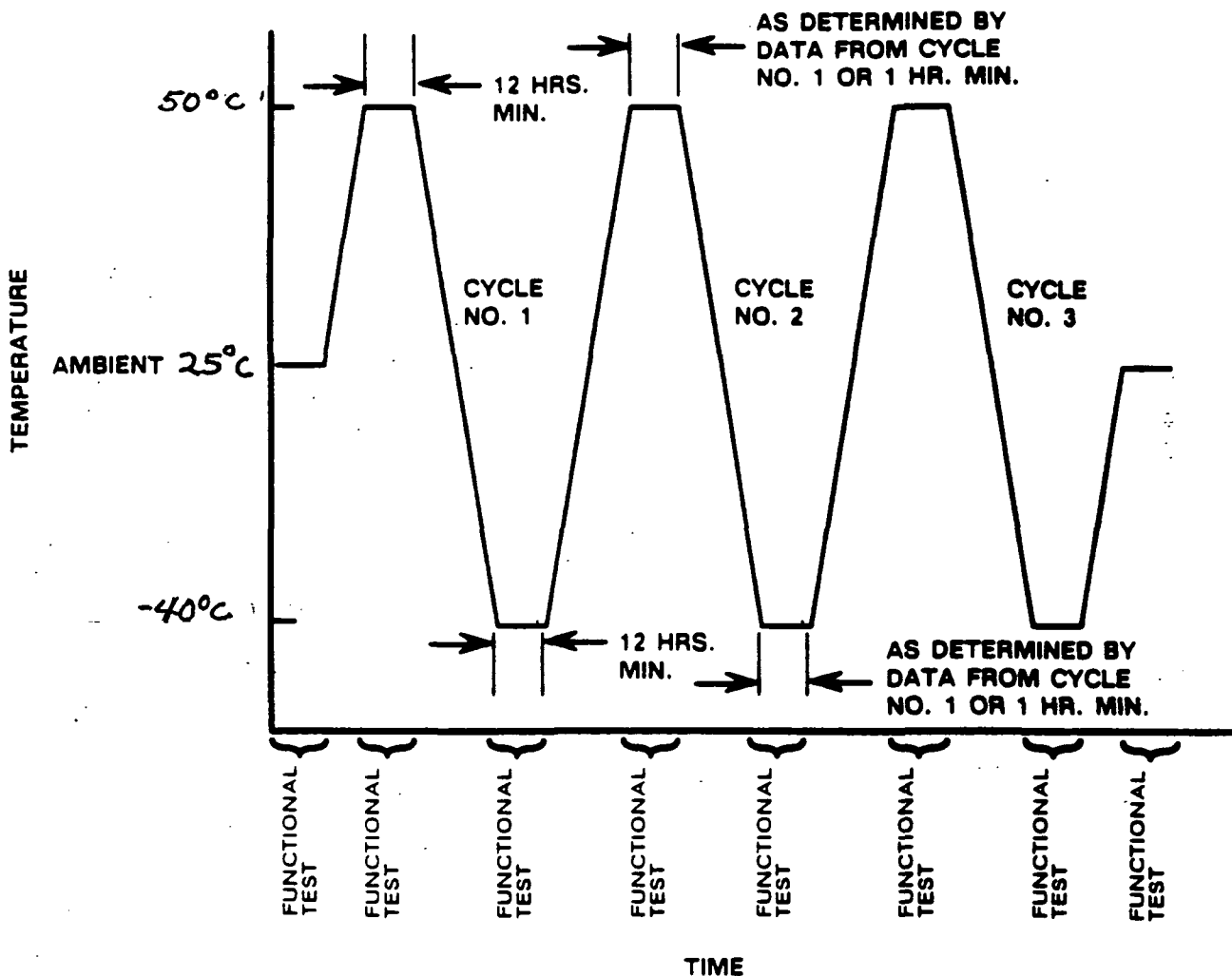


FIGURE 4

COMPONENT QUALIFICATION TEST (THERMAL/VACUUM)

SIZE A	FSCM NO. 88379	<i>ATP 20049</i>	
SCALE		REV. <i>B</i>	SHEET <i>12</i>

MOTOR					ENCODER				
Step	1	2	3	4	Pos.	1	2	3	4
1	+		RTN		-	0	0	0	0
2		+		RTN	-	0	0	0	0
3	RTN		+		-	0	0	0	0
4		RTN		+	2	0	0	1	0
5	+		RTN						
6		+		RTN					
7	RTN		+						
8		RTN		+	3	0	0	1	1
9									
10	REPEAT								
11									
12		RTN		+	4	0	1	0	0
13									
14	REPEAT								
15									
16		RTN		+	5	0	1	0	1
17									
18	REPEAT								
19									
20		RTN		+	6	0	1	1	0
21									
22	REPEAT								
23									
24		RTN		+	7	0	1	1	1
25									
26	REPEAT								
27									
28		RTN		+	8	1	0	0	0
29									
30	REPEAT								
31									
32		RTN		+	9	1	0	0	1
33									
34	REPEAT								
35									
36		RTN		+	10	1	0	1	0
37									
38	REPEAT								
39									
40		RTN		+	11	1	0	1	1
41									
42	REPEAT								
43									
44		RTN		+	12	1	1	0	0
45									
46	REPEAT								
47									
48		RTN		+	1	0	0	0	1

TABLE 1
MOTOR STEP SEQUENCE
AND ENCODER POSITIONS

SIZE A	FSCM NO. 88379	ATP20049	
SCALE	REV. B	SHEET 13	

TABLE 2.

TEST SEQUENCE FOR VIBRATION

AND SHOCK

SINE VIBRATION
PER NASB-39409 APPENDIX A,
FIGURE 2

TEST PER ATP 20049
PARAGRAPHS 3.1.3,
3.2.1, 3.3.1, 3.3.2

RANDOM VIBRATION
PER NASB-39409 APPENDIX A,
FIGURE 3

TEST PER ATP 20049
PARAGRAPHS 3.1.3, 3.2.1
3.3.1, 3.3.2

SHOCK RESPONSE
PER NASB-39409 APPENDIX A,
FIGURE 5

TEST PER ATP 20049
PARAGRAPHS 3.1.3, 3.2.1,
3.3.1, 3.3.2, 3.2.4.2
EXCEPT REDUCE VOLTAGE TO 100 VRMS
FOR DIELECTRIC STRENGTH

SIZE A	FSCM NO. 88379	ATP 20049	
SCALE	REV. B	SHEET 14	

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SEE ACCEPTANCE TEST PROCEDURE - ATP 20049

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	REV.	B	B	B	B																														

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	DRAWN <i>[Signature]</i>			
	CHECKED <i>[Signature]</i> 9-1-94			
MATERIAL	ENGNRG. <i>[Signature]</i> 9-1-94	DATA SHEETS - ACCEPTANCE TEST PROCEDURE - MOTOR/ENCODER - 16187 ENG. UNIT		
	DESIGN			
FINISH	QA	SIZE A	FSCM NO. 88379	ATP 20049-DS-ENG
	MFG.	SCALE	WEIGHT	SHEET 1 OF 4

1.0 TORQUE AND OPERATING POINT

1.1. DETENT TORQUE

Cogging through three detent positions 0.25 oz-in min

1. _____ oz-in.
2. _____ oz-in.
3. _____ oz-in.

1.2 OPERATING TORQUE

Motor rotates 6 RPM min when 4.8 pps at 22 VDC to 25 VDC is applied with 5.5 oz-in load.

_____ RPM

1.3 STALL TORQUE

6 oz-in minimum at 22 VDC

_____ oz-in
- Detent torque in 1.1=
Stall torque _____ oz-in

2.0 MOTOR ELECTRICAL CHARACTERISTICS

2.1 STEP ANGLE

Motor lead #1(+22 VDC) to motor lead #3 (RTN) cw rotation _____
7.5 +/- 0.75 _____
degrees _____

Motor lead #2 (+22 VDC) to motor lead #4 (RTN) cw rotation _____
7.5 +/-0.75 _____
degrees _____

2.2 WINDING RESISTANCE AT 20 DEG C

Room ambient temperature _____ deg C

Resistance between wires 1 and 3 _____ ohms

Resistance calculated for 20 degrees C _____ ohms
77.6 ohms minimum

Resistance between wires 2 and 4 _____ ohms

Resistance calculated for 20 degrees C _____ ohms
77.6 ohms minimum

2.3 WINDING INDUCTANCE

Inductance between wires 1 and 3 _____ mH

Inductance between wires 2 and 4 _____ mH

These values are for reference only.

SIZE A	FSCM NO. 88379	ATP 20049-DS-ENG	
SCALE		REV. B	SHEET 20F4

2.4 INSULATION RESISTANCE AND DIELECTRIC STRENGTH POST-IMPREGNATION

Tie together motor leads 1 and 3, 2 and 4

2.4.1 INSULATION RESISTANCE

100 VDC between 1,3 and 2,4

_____ Megohms
100 Megohms min

100 VDC between 1,3 and housing

_____ Megohms
100 Megohms min

100 VDC between 2,4 and housing

_____ Megohms
100 Megohms min

2.4.2 DIELECTRIC STRENGTH

125 VRMS between 1,3 and 2,4

_____ microamps
100 microamps max leakage

125 VRMS between 1,3 and housing

_____ microamps
100 microamps max leakage

125 VRMS between 2,4 and housing

_____ microamps
100 microamps max leakage

3.0 ENCODER ELECTRICAL CHARACTERISTICS

3.1 ENCODER POSITION 1 AND OUTPUT VOLTAGE

Encoder position 1 is according to Table 1 _____ check

Output voltage across bit 4 is 3.5 Vdc min at 4.8 VDC min
5.0 VDC max _____ check

3.2 ENCODER POSITION VERIFICATION

Encoder position 2 through 12 is according to Table 1 _____ check

4.0 MOTOR/ENCODER PHYSICAL CHARACTERISTICS

4.1 SIZE AND CONFIGURATION

Check that critical dimensions from MSFC drawing SXI-201 and Aeroflex
drawing 200-38 are satisfied _____ check

4.2 WEIGHT

Motor/Encoder weight
Lead wire weight

_____ ounces
- _____ ounces
= _____ ounces
15 ounces max

SIZE A	FSCM NO. 88379	ATP 20049-DS-ENG	
SCALE	REV. B	SHEET 3 OF 4	

4.3 RADIAL DEFLECTION

9.0 +/- 0.1 lb force applied on the shaft in
accordance with MSFC drawing SXI-201, Proof Load
Diagram

_____ inches

0.0015 inches max

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SIZE A	FSCM NO. 88379	ATP 20049-DS-ENG	
SCALE		REV. B	SHEET 4 OF 4

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BONDMASTER E645

DESCRIPTION

BONDMASTER E645 is a two-part, thermosetting, formulated epoxy adhesive for bonding stack laminations used in stators, rotors, gyros, servomechanisms, synchros, transformers and magnetic amplifiers. It can also be used as an insulating varnish for impregnating coils and small electrical equipment. Bonding is achieved by heat. Only sufficient pressure to insure complete contact is needed.


BONDMASTER E645 is a strong metal-to-metal adhesive. Because of its excellent mechanical strength plus its resistance to many solvents, to water, atmospheric conditions and temperature changes, this adhesive is adaptable to many industrial uses. It is particularly suited to the bonding of large surface areas and mass production processing.

CHARACTERISTICS

Typical Properties	E645 Part I	E645 Part II	Parts I & II Freshly Mixed
Color	Clear Amber	Clear	Clear Amber
Viscosity, cps	Approx 6,000	Water thin	Approx 700
Weight/Gallon	Approx 9.3 lbs	Approx 8.4 lbs	Approx 9.1 lbs
% Solids by Wt	Approx 77	Approx 12	Approx 62
Storage Life	1 Year	1 Year	1 MONTH

STORAGE LIFE

Both parts will have a shelf life of at least one year under normal conditions if kept in their shipping containers. Keep containers tightly closed to prevent solvent loss. This time can be lengthened by refrigeration. It will be considerably shortened by storage near radiators, boilers, ovens or in other hot areas. Store in a coop, dry area (50-84°F) if possible.

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	DRAWN				
MATERIAL	CHECKED	<i>[Signature]</i> 11/5/82	BONDMASTER E645		
	ENGR.	<i>Mike Burke</i> 11-5-82			
FINISH	MFg	<i>Hudson</i> 11/5/82	SIZE	FSCM NO.	P/N 612-3
	QA	<i>J. Dolan</i> 11/8/82	A	88379	
			SCALE	WEIGHT	SHEET 1 of 2

612-3

Part II does not tend to advance in viscosity during storage, but some settling may occur on prolonged storage. Stir well before using.

Mixed BONDMASTER E645 has a storage life of about one month under normal conditions. Use within that time limit. Storage of the mixed material at 40⁰-50⁰F will lengthen shelf life to as least 3 months. It will be shortened by heating or storing in or near heated areas.

PURCHASE FROM

National Starch & Chemical Corp.
Bondmaster Products

SIZE A	CODE IDENT NO. 88379	P/N 612-3
SCALE		SHEET 2

3-2102

APPLICATION

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DESCRIPTION

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3-30-83



612-20

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TOLERANCES:

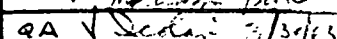
FRAC. DEC. ANG.

DRAWING STARTED DATE

DRAWN

CHECKED

ENGR

DES IMFG QA **AEROFLEX LABORATORIES INC.**

SOUTH SERVICE ROAD • PLAINVIEW LONG ISLAND, NY 11803

EPOXY ADHESIVE
(BONDMASTER M620)

SIZE

A

FSCM NO.

88379

612-20

SCALE

WEIGHT

SHEET 1 of 3

612-20

1.0 DESCRIPTION

BONDMASTER M620 is an easy-to-use, one-part ("no-mix"), 100% reactive, solvent-free, formulated epoxy adhesive that produces high-strength, structural bonds between practically any materials which can withstand a heat cure.

Fully-cured bonds exhibit minimal shrinkage, are electrical insulators, and provide excellent resistance to weather, galvanic action and most chemicals, acids and alkalies.

While BONDMASTER M620 spreads smoothly and evenly, it maintains its form once applied and DOES NOT FLOW during the cure cycle. Excellent for "poor fit" and similar void-filling applications, as well as where dripping or running of adhesive must be controlled.

2.0 SURFACE PREPARATION

All bonding surfaces must be thoroughly cleaned, degreased and dried. For plastic surfaces, remove mold release, if any.

3.0 APPLICATION

Apply enough BONDMASTER M620 to fill all cavities and depressions in both surfaces being bonded and to leave about 4-6 mils of adhesive in the final glue line. This may be accomplished by coating 4-6 mils on one surface only or by coating 2-3 mils on each surface. If one surface is porous, more adhesive must be applied to fill the voids and yet produce final glue line thickness of 4-6 mils.

Press parts together firmly enough to establish and maintain intimate contact during cure.

4.0 CURING CYCLES

Any one of the following cycles may be used:

<u>Temperature in the Bonding Layer</u>	<u>MINIMUM Curing Time</u>
535°F*	7-20 minutes
500°F*	12-15 minutes
450°F	20-25 minutes
400°F	40-50 minutes
350°F	1½-2 hours
300°F	4-5 hours

*These two cycles are to be used only with thin glue lines
If glue lines are heavy, exotherm may cause hardening and/or partial decomposition of the adhesive.

SIZE A	FSCM NO. 88379	612-20	
SCALE		REV. A (RC-572)	SHEET 2 of 3

612-20

5.0 TYPICAL PROPERTIES

Viscosity: Buttery, Thixotropic
Color: Light Tan, Opaque
Base: Modified Epoxy
Solvent (clean-up): Uncured: Ketone
Solvent (dilution): Do not dilute
Storage: One ear

6.0 PURCHASE FROM

National Starch & Chemical Company
Bridgewater, New Jersey 08807

SIZE A	FSCM NO. 88379	612-20	
SCALE		REV. A (RC 572)	SHEET 3 of 3


612-20

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	RELEASE RC 367		<i>[Signature]</i>
		B	ECN 11035 RC-1112	9-26-88	<i>[Signature]</i>
		C	ADDED -3 ECN 11295	7-29-87	<i>[Signature]</i>
		D	ECN 11361 ADD -4 RC-1413	9-8-88	<i>[Signature]</i>

-4	1090	
-3	1095	
-2	2850 FT	(BLACK)
-1	2651	
DASH NO.	STYCAST NO.	REMARKS

PURCHASE FROM:
EMERSON & CUMING INC.
CANTON MASS. 02021

CAT# = 612-41-*

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON		DRAWING STARTED M. WHITTENDALE 5/5/81		DATE 5/5/81		 AEROFLEX LABORATORIES INC. SOUTH SERVICE ROAD • PLAINVIEW, LONG ISLAND, NY 11803	
FRAC.	DEC.	ANGLES	DRAWN				
MATERIAL:		CHECKED		RESIN, STYCAST			
<i>[Handwritten Mark]</i>		ENGR <i>[Signature]</i> 5/6/81					
FINISH:		<i>[Handwritten Mark]</i>		SIZE A		CODE IDENT NO. 88379	
<i>[Handwritten Mark]</i>		<i>[Handwritten Mark]</i> 3-13-84		SCALE <i>[Handwritten Mark]</i>		612-38-*	
						SHEET 1 OF 1	

APPLICATION		REVISIONS			
NEXT ASSY.	USED ON	LTR	DESCRIPTION	DATE	APPROVED
	16062	A	INITIAL REL	RG-1134	11-18-86 <i>D. Kenstein</i>

Scotchcast® Brand

Electrical Resin 5230

One-Part, UL Recognized, Class B, Epoxy Powder Resin

- Specially formulated for use in electrostatic fluid bed process
- Superior resistance to thermal and mechanical shock
- Superior cut-through resistance
- Excellent heat, chemical and moisture resistance
- Excellent electrical properties

Scotchcast® Brand Electrical Resin 5230 is manufactured by a fusion blend process insuring that each individual particle of power contains

all of the components necessary to effect a complete cure and attain stated performance characteristics. Resin 5230 is well-suited for such

electrical insulating applications as the coating of fractional horsepower motor armatures and stators.

Typical Properties


*Not recommended for specification purposes. Product specifications will be provided upon request.

Property	Value*
Color	Blue
Specific Gravity ¹ (Cured)	1.60
Electric Strength ⁴ 12-15 mil (30-38 mm) coating	1,000 V/mil (39.4 kV/mm)
Thermal Shock ² 10 cycles -75°C to 155°C 12-15 mil (30-38 mm) coated sandblasted panel	Passes
Impact Resistance ² 12-15 mil (30-38 mm) coated sandblasted panel; Gardner 5/8" (15.88 mm) Radius Impact Tester	180 in-lbs (18.1 N-m)
Cut-Through Resistance ² 1 lb weight (454 kg), 18 awg wire	320°C
Fungus Resistance ²	Funginert
Abrasion Resistance ² Removed from 12-15 mil (30-38 mm) coating Taber Abraser, Type A, CS-17 Wheel, 100 g wts	.11 g
Edge Coverage ² (Typical edge coverage obtainable on a variety of coated motor iron parts)	50-70%
Gel Time ² (@ 204°C hot plate)	25-35 sec

Test Methods

¹ASTM D-792
²JM Test Method

³MIL Std. 810B, Method 508
⁴ASTM D-149

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES: FRAC. DEC. ANG.	ORIG. DATE OF DWG. 11-18-86	 AEROFLEX LABORATORIES INCORPORATED		PLAINVIEW N.Y. 11803	
	DRAWN <i>D. Kenstein</i>				
MATERIAL	CHECKED	EPOXY POWDER RESIN (SCOTCHCAST ELEC RESIN 5230)			
	ENGNRG <i>E. J. J. 12/1/86</i>				
FINISH	DESIGN <i>123-A</i>	SIZE A	FSCM NO. 88379	612-54	
	QA <i>12/1/86</i>	SCALE	WEIGHT		
	MFG. <i>12/3/86</i>				

Industrial Electrical Products
Electro-Products Division/3M
225-4N 3M Center
St. Paul, Minnesota 55144

Usage Information

Method of Application

Before resin is applied, the object to be coated should be clean, dry and free of oils. Resin 5230 can be deposited in film thicknesses up to 5-18 mils (13 mm-.48 mm) on objects at room temperatures. Because it is applied to a room-temperature substrate, the powder can be selectively removed. Air used for fluidizing should be dried to -1°C (30°F) dew point.

Equipment is available for processes utilizing manual or automated application techniques. Manufacturers' names can be suggested upon request.

Curing

Resin 5230 is first placed in an electrostatic fluid bed and charged (40 to 80 kV), causing the epoxy resin particles to repel each other and move upward. This results in a cloud of charged particles above the surface of the bed. A grounded object is coated when passed through or placed in this cloud.

Curing is accomplished by heating

the coated part to a temperature above the melting point of the resin. The resin then melts, flows to a controlled extent, and coalesces into a smooth, continuous, thin, essentially uniform coating, which cures and bonds to the substrate. The coating maintains its uniformity on flat surfaces as well as in corners and on high points of the part.

The cure of Resin 5230 to a thermoset condition involves a time/temperature relationship. Figures below represent nominal guidelines for obtaining the resin's adhesion, impact and chemical resistance characteristics. Time periods do not include the time needed to reach cure temperature. Therefore, the user must determine the time required for the coated substrate to reach stated cure temperatures.

Cure Temperature	Time
177°C (350°F)	15 minutes
204°C (400°F)	8 minutes
232°C (450°F)	3 minutes

Handling Precautions

As with any finely divided organic material, dust clouds of resin can be ignited by open flames or electrical sparks. Resin dust collection equipment should be provided with adequate explosion release. Ventilation should be provided and possible sources of ignition eliminated. To avoid build-up of static electricity, equipment should be grounded.

Inhalation of the dust or of vapors arising during cure should be avoided as much as possible. Use only in well-ventilated areas. Curing ovens

should be vented to avoid vapor build-up in the work area. Many of the reactive materials used with epoxy resins have been reported to cause skin irritation and allergic skin reaction, particularly in sensitive individuals. If contact occurs, the skin should be washed with soap and water. Do not use solvent to remove resin from the skin. In case of eye contact, flush eyes immediately with water for at least ten minutes and call a physician.

Storage

The usable shelf life of Resin 5230 is four months from date of shipment, when product is stored in its original unopened container at temperatures not exceeding 24°C (75°F). When removing resin from the original shipping container, care

should be taken to prevent inclusion of foreign material. The bag should be resealed immediately after removing the resin. Excess moisture will cause agglomeration. For best results, store in a cool (4°C (40°F)), dry place.

UL Recognition

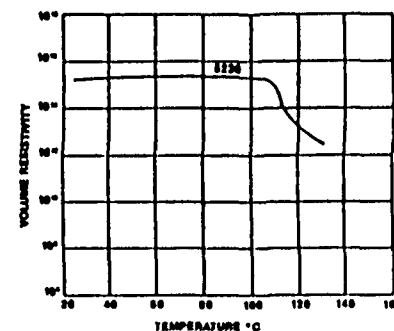
Resin 5230 has undergone extensive thermal testing and is UL recognized for continuous use at Class B (130°C) temperatures (UL Recognition #E35075 A and B, Guide GMF22).

Underwriters Laboratories (UL) recognized products have been evaluated for use as components of

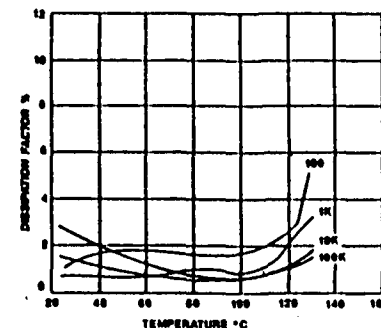
end-product equipment that is listed or classified by UL.

To achieve Underwriters Laboratories recognition, component construction must meet UL specifications and conditions of acceptability for proper and safe use of the component or product.

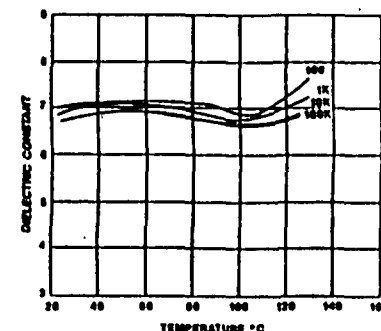
SCOTCHCAST RESIN 5230
VOLUME RESISTIVITY (OHM-CM)
ASTM D-967



SCOTCHCAST RESIN 5230
DISSIPATION FACTOR
ASTM D 150
(Test Frequency in Hertz)



SCOTCHCAST RESIN 5230
DIELECTRIC CONSTANT
ASTM D-150
(Test Frequency in Hertz)



SIZE
A

SCALE

~

REV.

SHEET

2 OF 2

FCM NO.
88379

612-54

FLUORIDED BOND COAT BLUE